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Prepared for:
Keystone Pipeline Project

A Summary Report of the January-February 2007 Aerial Raptor Nest / Bald Eagle Nest and Winter Roost Survey Completed for the Keystone Mainline and Cushing Extension Rights-of-Way

ENSR Corporation
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Executive Summary

Two aerial surveys were previously completed to collect raptor nest occurrence information along portions of the proposed Keystone Pipeline right-of-way (ROW) from March 28 through April 1, 2006, in Kansas and Missouri and from April 26 through May 2, 2006, in North Dakota, South Dakota, and Nebraska (ENSR 2006). This report covers a third additional raptor nest aerial survey conducted along the entire Keystone ROW (Illinois, Missouri, Kansas, Nebraska, South Dakota, and North Dakota) and the Cushing Extension ROW (Nebraska, Kansas, and Oklahoma) from January 30 through February 4, 2007. All aerial surveys were conducted in a helicopter with a pilot and a two-person survey team. The 2006 surveys covered an area of at least 0.25-mile on each side of the proposed ROW alignment, while the 2007 survey addressed only an approximate 150-foot ROW corridor along each side of the proposed pipeline centerline (300-foot-wide survey path). At major river crossings, survey coverage was expanded to 1 mile on each side of the ROW to search for bald eagle nests and their winter roost sites.

The 2007 survey documented 112 raptor nests within the proposed Keystone Pipeline Project construction ROW. These included 93 nests along the Mainline ROW (2-Illinois, 44-Missouri, 19-Kansas, 15-Nebraska, 4-South Dakota, 9-North Dakota) and 19 nests along the Cushing Extension (16-Kansas, 3-Oklahoma).

Additionally, two osprey hack sites have been identified within the immediate vicinity of the proposed Missouri River crossing near Yankton, South Dakota. Discussion with the South Dakota Game, Fish, and Parks Department (SDGFP) indicates that the two hack sites may be used again in 2007, 2008, and 2009.

Surveys for wintering bald eagles identified transitory or communal roosts and winter concentration areas within 1 mile of the Mainline ROW at the Mississippi River crossing, the Missouri River near its confluence with the Mississippi, the Cuivre River, the West Fork of the Cuivre River, the Missouri River at the Kansas/Missouri state line, and the Big Blue River. Roosts and wintering concentrations of bald eagles within 1 mile of the Cushing Extension ROW were identified at the Little Blue River, Mill Creek, Republican River, Smoky Hill River, Arkansas River, and Salt Fork of the Arkansas River.

A total of 7 bald eagle nests were located within 1 mile of the Mainline ROW. These included two bald eagle nests at the Mississippi River crossing near Confluence Park, three nests in the Cuivre and Missouri River floodplain in Missouri, one nest at the Big Blue River in Kansas, and one at the Pembina River in North Dakota. Two nests were observed within 1 mile of the Cushing Extension ROW, one on the Smoky Hill River in Kansas and one nest in poor shape at the Arkansas River in Oklahoma.

1.0 Introduction

Keystone is planning to construct, operate, and maintain an approximately 1,845-mile-long interstate crude oil transmission system from an oil supply hub near Hardisty, Alberta, Canada to destinations in the Midwestern United States (U.S.) (**Figure 1**). ENSR Corporation (ENSR) has been retained by Keystone to assist with environmental permitting for the proposed Keystone Pipeline Project (Project) within the U.S. In the U.S., the proposed Project consists of approximately 1,078 miles of new pipeline constructed from the U.S.-Canada border in Pembina County, North Dakota, to terminals and refineries in Salisbury (Chariton County), Missouri; Wood River (Madison County); and Patoka (Marion County), Illinois. This route is identified as the Mainline. Based on interest expressed by crude oil shippers, Keystone also is considering the construction of a 294-mile pipeline extension, which would extend the Keystone Pipeline south from the Nebraska/Kansas border (Jefferson County) to Cushing, Oklahoma. The primary delivery point would be in the Cushing area, with potential connections to refineries or pipelines in Kansas and North Texas as well as Oklahoma. This portion

of the Keystone Pipeline system is named the Cushing Extension. Keystone proposes to begin construction of the new pipeline in the spring of 2008, with the Keystone Mainline in-service by the end of 2009.

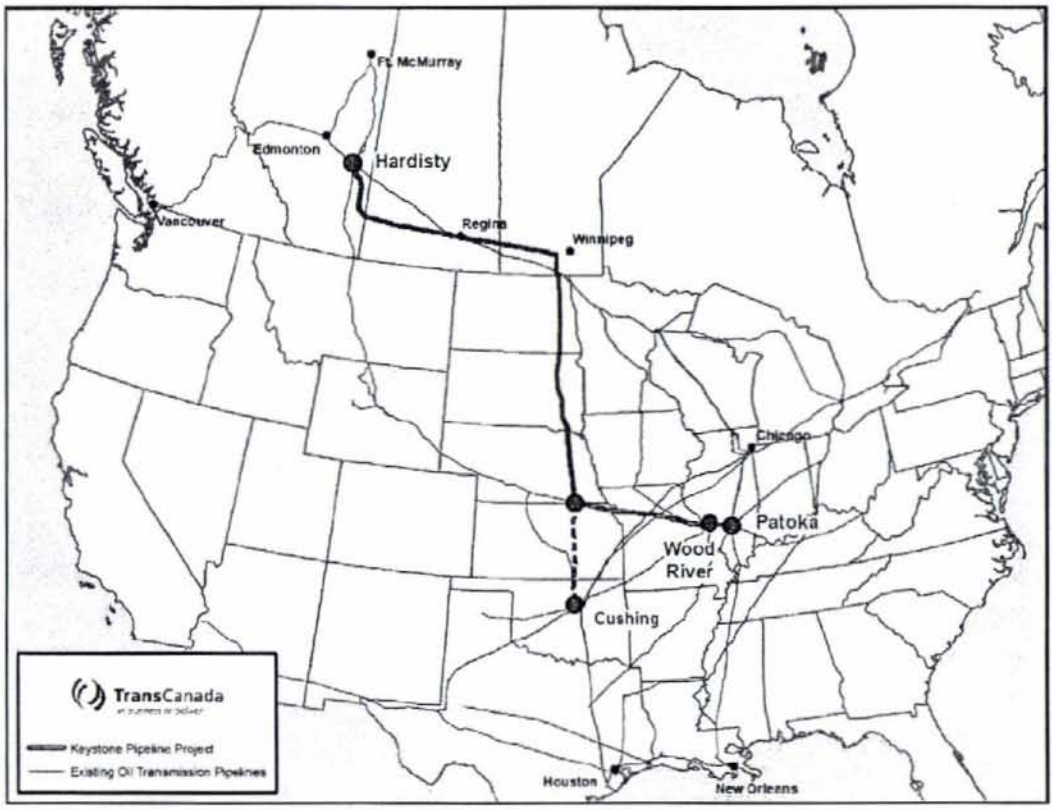

Figure 1 Proposed Keystone Pipeline Route (Cushing Extension represented by the dotted line)

The Project also will require the construction of pump stations, valves, meters, and other ancillary facilities. Location data for these facilities was not available at the time of this survey; therefore, surveys required for these project features need to be completed prior to construction.

Background Information

A variety of raptor species are known to nest in the region of the proposed Project. These species include eagles, buteos, falcons, owls, harriers, osprey, and other birds of prey. Breeding and nest building/tending activities can begin as early as February for some raptor species, and the rearing of young and fledgling dependency can last into early August for some of the later nesting species. Protected raptor species occurring along the proposed Keystone Pipeline Project route include the bald eagle, northern harrier, peregrine falcon, and barn owl. Other raptors identified as species of special concern include the Cooper's hawk, red-shouldered hawk, broad-winged hawk, and short-eared owl.

Information obtained by Keystone on historic raptor nest sites in the vicinity of the proposed ROW was primarily limited to listed species, including bald eagles. The principal methods for locating nest sites along the proposed pipeline route were the aerial surveys conducted by helicopter in late March through early May 2006 and the January-February 2007 survey.

2.0 Methods

Aerial survey methods for the 2007 followed those outlined by Call (1978). Two surveyors (seated in left- and right-hand positions of the helicopter) examined the area within the 300-foot-wide construction corridor along the entire Mainline and Cushing Extension ROW to locate existing raptor nest sites. In addition, a 1-mile survey area on each side of the ROW was employed to locate potential bald eagle nest and winter roost sites where the ROW intercepted major river crossings, such as the Platte and Missouri rivers. Aircraft navigation along the proposed pipeline ROW and maintenance of appropriate aircraft position in relation to the ROW was then facilitated using a pilot operated and monitored GPS unit and real time GPS tracking on an on-board computer. Aircraft position and location along the ROW was further monitored by the front, right-hand observer using a separate GPS unit that displayed real time position and the ROW centerline on DRG (digital raster graphic) 7.5-minute USGS topographic maps exhibited on the observer's laptop computer screen.

The 2007 aerial raptor survey focused on locating raptor stick nests constructed in trees in riparian zones, shelterbelts, and other wooded areas, and on locating bald eagle winter roost sites along the major river crossings. Winter timing of the survey facilitated locating nests in deciduous trees prior to leaf-out. No areas of cliffs, rock outcrop, knolls, and topographic features suitable for raptor nesting use were located within the Keystone Mainline or Cushing Extension ROW. In addition to recording raptor nest sites, heron rookeries (communal nest areas) were also recorded by the survey since herons are migratory along most portions of the Keystone Pipeline ROW. Herons are protected under the Migratory Bird Treaty Act (MBTA). Nesting herons are susceptible to disturbance and pipeline construction near a rookery during the nesting season and could result in nest abandonment and a potential "take" or loss of young of these bird species.

The January-February 2007 survey started at the eastern terminus (Patoka) of the Keystone Mainline on January 30, and proceeded westward to the junction of the Keystone Mainline and Cushing Extension. The Cushing Extension segment was surveyed on February 1, and the remainder of the Keystone Mainline, north of the Keystone Mainline/Cushing Extension junction, was surveyed from February 2 through 4.

Surveys were conducted between sunrise and sunset (approximately 0800 to 1730 Central Time). The date, temperature, wind, and cloud cover were recorded at the beginning of each survey day and at the end of each survey day; changes in overall weather conditions during the survey were also recorded.

Temperatures during the survey ranged from highs of approximately 20 degrees Fahrenheit (°F) to lows of minus 25°F. Skies were generally clear to partly cloudy with little to no precipitation. Sporadic, light snowfall events were encountered the morning of January 30 in western Illinois and the afternoon of January 31 in western Missouri and eastern Kansas along the Mainline ROW, but visibility of the ROW was not compromised. West/northwest winds were fairly consistent, ranging from 5 to 15 miles per hour (mph) during most of the survey period.

Complete coverage of the entire ROW was obtained by traveling down the ROW centerline and visually scanning all areas of potential nesting habitat. This typically involved slowing aircraft speed to 25 to 40 mph when woodlands, shelterbelts, riparian areas, and isolated trees were encountered. Once a possible nest site was located, a second pass-over was made to confirm nest type and condition and to obtain accurate GPS location coordinates using the front observer's GPS unit. The rear observer recorded notes on nest configuration, condition, possible species, habitat, and nearest pipeline milepost.

All major rivers crossed by the Keystone Mainline and Cushing Extension ROW were initially selected as potential areas to be searched for bald eagle winter roosting activity (**Table 1**). However, during the January-February 2007 aerial survey a number of these crossings were determined not to support suitable bald eagle winter roosting habitat, either because the river was completely frozen over and there was no open water for bald eagle foraging and/or there were no suitably sized roost trees along the river within 1 mile of the ROW

(**Table 1**). At major river crossings where suitable bald eagle winter roosting habitat (large trees and open water) was present, a 2-mile survey corridor centered on the ROW was obtained by flying 1 mile from the ROW centerline along one side of the river and returning along the opposite side of the river to the ROW centerline. The same process was then repeated on the opposite side of the ROW. Only raptor nests large enough to support eagle nesting activity were recorded outside of the 300-foot ROW but within 1 mile of the ROW centerline. The observers were also alert to noting and recording perched bald eagles in trees as well as bald eagles flying along the river corridor. GPS location coordinates were recorded for all bald eagle nest and roost sites observed. In addition, general GPS coordinates were recorded for areas along the river where bald eagles were observed in flight. General observations on bald eagle behavior and numbers were also recorded where birds were observed.

Initially, the focus of the bald eagle roosting portion of the surveys was to survey major river crossings either early in the morning (within an hour after sunrise) or late in the afternoon (1 hour before sunset) when eagles were most likely to found using nighttime roost sites. However, as the survey progressed, it was noted that bald eagles appeared to be remaining in or near roost sites along the major rivers during most of the day as a result of the cold temperatures (less than 20°F down to subzero temperatures) that were encountered throughout the survey period. In addition, it also was noted that bald eagles often flushed from perch sites as the helicopter flew into the vicinity making accurate identification of specific roosts difficult. As a result, survey emphasis shifted to recording bald eagle presence rather than specific roost trees although eagle perch site locations were still recorded. It was assumed that if bald eagles were located within 1 mile of the ROW then nighttime roost sites were also likely to be present within 1 mile of the ROW.

3.0 Results

3.1 Bald Eagle Winter Roost and Nest Sites

The U.S. Fish and Wildlife Service (USFWS) defines two types of bald eagle winter roost sites. Transitory roosts are described as sites with three or more eagles within 100 meters of each other for at least two nights in an area with no previous history of winter communal roosting. Communal roosts are defined as six or more eagles in a small area for extended periods of time or used for multiple years. Since a one-time winter aerial survey cannot distinguish between transitory roosts versus communal roosts, it was assumed that if bald eagles were observed perching along a river within 1 mile of the ROW then at least some type of roosting activity occurs within 1 mile of the ROW. Follow-up ground surveys would be required to determine if identified roosting areas represent transitory or communal roost sites.

3.1.1 Mainline ROW

Out of the 24 major river crossings initially selected as potential bald eagle winter roost areas on the Keystone Mainline ROW, 14 were found to be frozen solid and/or supported no suitable-sized perch trees near the ROW. These river crossing were not surveyed for bald eagle winter roosting use (**Table 1**). The Pembina River in North Dakota was frozen solid making it unsuitable for winter roosting use, but one historic bald eagle nest was located on the south side of the river. Four additional river crossings (Missouri River at South Dakota/ Nebraska border, Platte River in Nebraska, Grand River in Missouri, and Kaskaskia River in Missouri) were surveyed for bald eagle use, but no eagles were observed within 1 mile of the ROW. The Missouri River ROW crossing at the South Dakota/Nebraska border exhibited suitable stretches of open water for bald eagle foraging, but the south bank had few large perch trees. The north bank crossing is close to Yankton and other human activities rendering this area unsuitable for bald eagle roosting use. One historic eagle nest was located approximately 1.5 miles downstream of the ROW on the north side of the river, and two adults were seen nearby. In addition, at least 10 adult and immature bald eagles were observed along the river corridor near the Lewis and Clark Lake dam (Gavins Point Dam) approximately 5 miles upstream of the ROW. The area of the Platte River ROW crossing in Nebraska exhibited only one very narrow, short stretch of open water making this reach of the river unsuitable for bald eagle foraging. Suitable roost trees and open water were

determined to be present at the Grand River ROW crossing in Missouri, but no eagles or eagle nests were found within 1 mile of the ROW. The ROW crossing at the Kaskaskia River and adjacent wetland complexes was found to exhibit only limited areas of open water with few potential perch trees within 1 mile of the ROW, and no eagles were noted using this area.

Bald eagles and bald eagle perch/roost trees were recorded at the five remaining major rivers either crossed or approached by the Keystone Mainline ROW. These were the Big Blue River in Kansas, the Missouri River at the Kansas/Missouri state line, West Fork of the Cuivre and the Cuivre River (two locations) in Missouri, and the Mississippi River at the Missouri/Illinois state line (**Tables 1** and **2**). Two adult eagles were noted roosting on the Big Blue River within 1 mile of the ROW. In addition, one possible eagle nest was located in a heron rookery within 1 mile of the ROW on the Big Blue River. Several eagles and perch/roost locations were observed within 1 mile of the ROW on the Missouri River at the Kansas/Missouri state line. Eagle roosting use was documented for both the West Fork of the Cuivre River and the Cuivre River within 1 mile of the ROW, and two eagle nests were found on the Cuivre River within 1 mile of the ROW (**Table 2**).

3.1.2 Cushing Extension

Bald eagle presence and roosting use was documented within 1 mile of the ROW along six of the seven major rivers crossed by the Cushing Extension ROW (**Tables 1** and **2**). Observations within 1 mile of the ROW included two adults and one immature eagle on the Little Blue River, two adult eagles on Mill Creek, several adult eagles on the Republican River, one adult and one eagle nest on the Smoky Hill River, three adult and two immature eagles on the Arkansas River, and three adults and one immature eagle on the Salt Fork Arkansas River at its confluence with the Bois'd Arc River. The confluence of the Salt Fork Arkansas River and Bois'd Arc River is a documented historic eagle concentration area. The Cimarron River was the only major river crossed by the Cushing Extension where eagle presence was not documented within 1 mile of the ROW. This segment of the river also supported few suitable roost sized trees. Three perched eagles, however, were located along a segment of the Cimarron River approximately 1.5 to 4 miles downstream of the ROW, and one nest in poor condition was found approximately 1 mile downstream of the ROW.

3.2 Other Raptor Nest Sites

Table 3 provides a listing of all raptor nest locations (including great blue heron rookeries) identified by January-February 2007 aerial survey along the Keystone Mainline ROW and Cushing Extension ROW. A total of 112 nest sites were documented within the survey area. Of these, seven were heron nest sites representing three separate rookery areas (two on the Keystone Mainline ROW and one on the Cushing Extension). The remaining 105 nests were potential raptor nest sites with 90 on the Keystone Mainline ROW (2 in Illinois, 43 in Missouri, 17 in Kansas, 15 in Nebraska, 4 in South Dakota, and 9 in North Dakota) and 15 nests along the Cushing Extension (12 in Kansas, 3 in Oklahoma). The listing includes bald eagle nests within 1 mile of the ROW centerline and all other possible raptor and heron nests within a 150-foot construction corridor on each side of the ROW centerline. **Table 3** also includes GPS coordinates for each nest location as well as information on species ownership, nest condition, and habitat. All nests located were tree nests, and no other types of potential nesting habitat, such as cliffs or rock outcrops, were located within the survey corridor.

Twenty-six of the 2007 survey nests had been identified during the 2006 surveys of the Keystone Mainline ROW. Nine other previously identified raptor nest locations within the Keystone Mainline ROW were either not found (site #75, 86, 98, 111, and 133), were located just outside of the proposed ROW corridor (site #190 and 191), or were determined not to be raptor nests (site #83 and 184). The remainder of the nests documented by the 2006 surveys were well outside of the 300-foot ROW corridor. It is quite possible that nests not relocated by the 2007 survey had been lost to the severe winter ice storms that had plagued the region prior to the survey. Considerable ice storm damage to trees in the form of broken limbs and trunks was clearly evident along many portions of the ROW during the January-February 2007 survey.

Because of the winter timing of the survey, information on activity status of nests was limited to a few bald eagle, great horned owl, and red-tailed hawk nests that showed evidence of early season nesting use. Active

nests included three bald eagle nests that either had an adult on a nest or adults nearby that were assumed to be establishing a nesting territory, one red-tailed hawk nest with a pair of adults nearby, one red-tailed hawk nest with an adult incubating a single egg, and a great horned owl nest with an adult in incubation posture. The one red-tailed hawk nest with an adult incubating an egg was a very early nesting attempt for this species.

Species ownership determinations for remaining nests were based on nest size, configuration, and location. Beyond the few nests where species ownership was determined by presence of adults, the majority were classified as red-tailed hawk or accipiter (either Cooper's hawk or sharp-shinned hawk) (**Table 3**). Great horned owl, long-eared owl, and American crow could also use nests classified as accipiter.

In addition to the raptor nest sites identified above, two osprey hack sites were identified during field reconnaissance efforts in 2006 near the Missouri River crossing near Yankton, South Dakota. The hack sites are artificial nesting towers approximately 15 feet aboveground, located in the Paddlewheel Point Natural Area. The nearest hack site is located approximately 450 feet east from the Project ROW. The second hack site is located approximately 750 feet east from the Project ROW. The hack sites were used to hack osprey in 2006. The birds were placed in the hack site on July 26 and were considered fledged by August 12. The SDGFP indicated that this site could possibly be used again in 2008 and 2009, if appropriate funding was available.

4.0 Discussion

Based on the findings of the 2006 and 2007 aerial surveys, a number of raptor species breed and forage in and near the Project ROW. The most common species include red-tailed hawks and great-horned owls, with scattered breeding records for the Swainson's hawk, northern harrier, American kestrel, red-shouldered hawk, osprey, and bald eagle. Given the aerial survey method employed for the project, nests of some species such as cavity nesters (American kestrel and eastern screech owl) ground nesters (short-eared owl, burrowing owl, turkey vulture, and northern harrier), and woodland nesters in evergreens (accipiters, long-eared owl, and great horned owl) could not be effectively located. Survey emphasis was placed on locating nests of eagles, buteos (broad-winged hawks), and accipiters and owls that nest in deciduous trees. These are the most common species that could be affected by project construction, particularly if it were to occur within the breeding season (February through August).

The intent of these surveys was to identify as many raptor nests as possible within the immediate vicinity of the proposed pipeline ROW. The surveys were conducted in 2006 and 2007, in anticipation of construction in 2008. Nest data will aid in project planning in two ways: 1) provide information to avoid the disturbance of nest sites located within the construction ROW during the breeding season, or if necessary, identify nests that may need to be removed outside of the nesting season; and 2) provide historic nest location information for specific follow-up surveys that may need to be completed to determine activity status immediately prior to construction. For the purposes of avoiding adverse impacts to wintering bald eagles, follow-up surveys would need to be employed at major river crossings with documented eagle use to confirm the location of transitory or communal winter roost sites, if pipeline construction will occur at any of these crossings between October 1 and January 31. Winter roost surveys need to be conducted at least one day prior to the first date of construction.

Use of GPS

GPS provides an advanced, practical method for precise navigation and to obtain accurate location data, particularly in areas with little to no topographic relief or prominent landmarks; however, use of GPS can occasionally have limitations. Due to wind movement and positioning of the helicopter, GPS coordinate locations could be up to 100 to 200 feet in error from the actual nest location. All efforts were made to obtain

the most accurate GPS coordinate locations possible during the aerial surveys. However, two principal factors are believed to affect the overall accuracy of GPS recorded raptor nest locations during aerial surveys.

First, it was often difficult to maintain aircraft position directly over a nest site long enough to obtain GPS accuracy because of nest location, topography, wind, and other factors affecting flight conditions. Second, the GPS units used during the aerial surveys required several seconds of acquiring and averaging satellite position data to compute the most accurate location coordinates for each waypoint recorded. This factor in combination with difficulties in maintaining aircraft position exactly over the nest site were believed to be the greatest contributing factors to errors in obtaining the most accurate GPS coordinates for nest sites. Another complication related to obtaining accurate GPS coordinates, especially for active nest sites, was the aerial survey crew's concern for potential disturbance of active nests, particularly when an incubating adult bird was present on the nest. In order to avoid undue disturbance of these nests, the extent of aircraft time near the nest was kept to a minimum, and these nests were only approached close enough to obtain accurate information regarding nest type and species presence.

The accuracy of the majority of the nest location coordinates obtained during the January-February 2007 survey was believed to very high (±15 meters or less) during this survey period for two reasons: 1) relatively calm or steady winds and 2) inactive status of most nests because of winter timing of survey. The combination of these two factors permitted the pilot to maintain aircraft position directly over each nest site until the observer's GPS had locked in on the location coordinates thereby obtaining as accurate a GPS reading as possible. During the 2007 survey, there were only a small number of nests (**Table 3**) with early season activity (presence of adults on nest or in incubation posture). At these nests the GPS location was taken as quickly as possible and not immediately over the nest, and location accuracy was slightly compromised to avoid undue disturbance of the nest.

Even with less than optimal accuracy for some nest location coordinates, ENSR is confident that the data provided in this report and for the 2006 survey will be sufficient for future nest identification, project planning, and application of appropriate mitigation measures, if warranted. The next important step in the protection of breeding raptors from project construction and operation will be consultation with the USFWS, as well as applicable state game and fish departments, and the development of an agency approved mitigation plan and implementation process.

5.0 Mitigation Planning

The data from these surveys will allow Keystone and appropriate wildlife agencies to plan construction along the ROW and temporary use areas to avoid the removal of existing raptor nests, where possible. Raptor nest surveys were conducted during the 2006 breeding season and late winter 2007 to obtain complete coverage for the Keystone Mainline ROW and Cushing Extension ROW. However, pipeline construction is currently proposed to commence in 2008. It is highly likely that activity status of nests will change, some existing nests may be lost, and new nests constructed in the interim between survey completion and pipeline construction in 2008. It is Keystone's intent to minimize impacts to wildlife species, including breeding raptors, and it is anticipated that additional raptor surveys would be completed immediately prior to construction to confirm nest locations and activity status. All attempts would be made to construct during periods with the most minimal impacts to breeding birds. In the event that construction occurs during the breeding season, it may be necessary to provide a biological monitor or clearance surveys along certain portions of the route that would be scheduled for construction between February 1 and August 31 to prevent disturbance to nesting raptor species. However, these measures would depend on a number of site-specific factors and would be determined on a case-by-case basis with the applicable agencies.

It is anticipated that areas that would be disturbed by project construction and reclamation would be resurveyed prior to commencement of construction activities, or a biological monitor would be present to

determine whether birds were moving into the area and could be affected by project activities. Based on these survey results, Keystone would coordinate with the applicable agencies to determine whether additional protection measures may be warranted. It is possible that construction could proceed in certain areas near known nests depending on the activity status of a given nest, the distance between construction and the nest site, line-of-sight implications between the nest site and construction activities, duration and type of construction activity, and/or the presence of a qualified biologist to monitor bird behavior and response to construction activity. However, it is also likely under certain conditions that the agencies would require a buffer area around an active site and a construction constraint period within this buffer area until breeding is complete and the young had fledged.

The development and implementation of potential mitigation measures would depend on a number of factors, including species involved, its relative sensitivity to disturbance, the time of year, the type of activity proposed (e.g., trenching versus reclamation), the duration and timing of this activity, and possible topographical shielding. The use of a biological monitor may be warranted to allow construction to proceed in certain areas to ensure that nest sites are not disturbed and/or abandoned. These decisions would be made by the applicable agencies in consultation with Keystone.

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ENSR. 2006. A summary report of aerial surveys conducted for raptor nests along the Keystone Pipeline Project right-of-way in Missouri, Kansas, Nebraska, South Dakota, and North Dakota. ENSR, Fort Collins, Colorado. 23 pp.

Table 1 Status and Results of Waterbodies Along the Keystone Pipeline Project that were Evaluated for Bald Eagle Winter Roost and Nest Sites – January 29 to February 4, 2007

Milepost	Waterbody Name	Status	County	State	Bald Eagle Roost/Nest Identified Near ROW	Crossing Coordinates		Number/ Age Class	Comments
						Latitude	Longitude		
KEYSTONE MAINLINE									
7.4	Pembina River	Frozen (no roost survey)	Cavalier	ND	Nest	48.89577	-97.94752	None	2 adult golden eagles perched near river
168.4	Sheyenne River	Frozen (no roost survey)	Ransom	ND	No	46.61135	-97.92859	None	
436	Missouri River	Open	Yankton	SD/NE	No	42.86511	-97.37886	10 adult and immature roosting on south bank approximately 5 miles upstream at reservoir spillway	Historic nest with 2 BAEA roosting in it approximately 1.5 miles downstream of ROW. Roosting more than 1 mile upstream at reservoir spillway; no roosting at ROW
502.8	Elkhorn River	Frozen and not many suitable roost trees (no roost survey)	Stanton	NE	No	41.92332	-97.26110	None	No open water and few suitable roost trees
542.0	Platte River	Limited open water	Colfax/ Butler	NE	No	41.38661	-97.19526	Numerous adults and immature roost at lake spillway more than 1 mile upstream from ROW	Roosting occurring more than 1 mile upstream from ROW at reservoir spillway. No roosting at ROW crossing

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Milepost	Waterbody Name	Status	County	State	Bald Eagle Roost/Nest Identified Near ROW	Crossing Coordinates		Number/ Age Class	Comments
						Latitude	Longitude		
591.0	West Fork Big Blue River	Frozen and narrow (no roost survey)	Saline	NE	No	40.69548	-97.09331	None	
658.5	Big Blue River	Open	Marshall	KS	Roost/Nest	39.97704	-96.60880	2 adults roosting within 1 mile of ROW on east bank.	Large nest in heron rookery within 1 mile of ROW
689.6	South Fork Big Nemaha River	Dry or frozen (no roost survey)	Nemaha	KS	No	39.86947	-96.04433	None	
748.5	Missouri River	Open	Buchanan/ Doniphan	KS/ MO	Roosts	39.69077	-94.96858	Approximately 12 adults and immatures roosting in or near ROW	Several roost locations identified within 100 feet of ROW
762.2	Platte River	Frozen (no roost survey)	Buchanan	MO	No	39.65697	-94.72426	None	
772.9	Castile Creek	Frozen (no roost survey)	Clinton	MO	No	39.63112	-94.52759	None	
780.9	Little Platte River	Frozen and narrow (no roost survey)	Clinton	MO	No	39.61772	-94.37949	None	
840.6	Grand River	Open	Carroll	MO	No	39.49229	-93.27723	None	Surveyed but no nests, roosts, or birds observed
845.9	Salt Creek	Frozen and narrow (no roost survey)	Chariton	MO	No	39.48129	-93.17953	None	
857.5	Mussel Fork Creek	Frozen and narrow (no	Chariton	MO	No	39.45151	-92.96301	None	

Table 1 **Status and Results of Waterbodies Along the Keystone Pipeline Project that were Evaluated for Bald Eagle Winter Roost and Nest Sites – January 29 to February 4, 2007**

Milepost	Waterbody Name	Status	County	State	Bald Eagle Roost/Nest Identified Near ROW	Crossing Coordinates		Number/ Age Class	Comments
						Latitude	Longitude		
		roost survey)							
862.4	Chariton	No large roost trees (no roost survey)	Chariton	MO	No	39.42408	-92.88270	None	
868.0	Middle Fork Little Chariton Creek	Frozen and narrow (no roost survey)	Chariton	MO	No	39.40159	-92.78659	None	
871.6	East Fork Little Chariton Creek	Frozen and narrow (no roost survey)	Chariton	MO	No	39.39222	-92.72052	None	
904.0	Goodwater Creek	Frozen and narrow (no roost survey)	Audrain	MO	No	39.27383	-92.13804	None	
955.0	West Fork Cuivre River	Open	Audrain	MO	Roost	39.16518	-91.70400	8 to 10 adults and immatures roosting	Communal roosts identified within 1 mile of ROW
971.1	Cuivre River	Open	Lincoln	MO	Roost	38.99453	-90.95320	more than 5 adults and immature roosting within 1 mile of ROW	Adult eagle on nest
996.7	Cuivre River	Open	Lincoln	MO	Roost/Nest	38.92449	-90.79268	more than 5 adults and immature roosting within 1 mile of ROW	1 good nest near heron rookery, one poor nest within 1 mile of ROW

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Milepost	Waterbody Name	Status	County	State	Bald Eagle Roost/Nest Identified Near ROW	Crossing Coordinates		Number/ Age Class	Comments
						Latitude	Longitude		
1021.1	Mississippi	Open	Madison	MO/IL	Roost/Nest	38.82587	-90.11623	Over 300 adult and immature roosting within 1 mile of ROW	1 historic nest at Confluence Park and 1 new nest south of Confluence Park identified within 1 mile of ROW
1072.1	Kaskaskia	Limited open water and roost trees (surveyed)	Bond	IL	No	38.80273	-89.18837	None	No nests or birds observed
CUSHING EXTENSION									
4.1	Little Blue River	Open	Washington	KS	Roost	39.97726	-96.99837	2 adults and 1 immature flushed within 1 mile of ROW, south bank	Cottonwood riparian area
9.7	Mill Creek	Limited open water	Charleston	KS	Transitory Roost?	39.84524	-96.99791	2 adults flushed within 1 mile of ROW	Cottonwood riparian area
51.2	Republican	Open	Clay	KS	Transitory Roosts?	39.30154	-97.04901	Several adults flushed within 1 mile of ROW	Cottonwood riparian area
76.5	Smoky Hill	Open	Dickinson	KS	Roost/Nest	38.93655	-97.04121	1 adult flushed about 1 mile from ROW	Nest identified within 0.5 mile of ROW
205.8	Arkansas	Open	Cowley	KS	Roosts	37.08467	-97.10110	3 adults and 2 immature flushed within 1 mile of ROW	

Table 1 **Status and Results of Waterbodies Along the Keystone Pipeline Project that were Evaluated for Bald Eagle Winter Roost and Nest Sites – January 29 to February 4, 2007**

Milepost	Waterbody Name	Status	County	State	Bald Eagle Roost/Nest Identified Near ROW	Crossing Coordinates		Number/ Age Class	Comments
						Latitude	Longitude		
241.2	Salt Fork Arkansas	Open	Kay	KS	Roosts	36.63023	-97.13415	3 adults and 1 immature at confluence of Bois 'd Arc and Salt Fork	Historic known concentration area; roosting observed within 1 mile of ROW
282	Cimarron River	Open	Payne	OK	Nest	36.02171	-96.83855	No eagles observed	Poor quality nest observed approximately 1 mile downstream of ROW; poor habitat conditions, not many roost trees. Three roosting eagles observed 1.5 to 4 miles downstream

Table 2 Bald Eagle Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number"	Survey Date	Milepost	Waterbody Name	Coordinates		Observation	Comments
				Latitude	Longitude		
KEYSTONE MAINLINE							
145	2/4/2007	7.4	Pembina River, North Dakota	48.89004	-97.95688	Nest	Historic nest on south bank near top of valley, within 1 mile of ROW
none taken		435.8	Missouri River, South Dakota/Nebraska	none	none	none within 1 mile of ROW	1 active historic nest approximately 1.5 miles downstream of ROW on N. bank. Ten eagles observed approximately 5 miles upstream near dam
82	1/31/2007	659.0	Big Blue River, Kansas	39.97165	-96.60685	Nest	Heron rookery within 1 mile of ROW
83	1/31/2007	658.5	Big Blue River, Kansas	39.98257	-96.60800	Transitory Roost?	2 adults flushed from tree near nest
59	1/31/2007	747.5	Missouri River, Kansas/Missouri	39.67560	-94.99326	Transitory and Communal Roosts	Immature and adults on East Bank of Missouri
60	1/31/2007	747.9	Missouri River, Kansas/Missouri	39.67676	-94.98295	Transitory and Communal Roosts	East Bank of Missouri
61	1/31/2007	748.1	Missouri River, Kansas/Missouri	39.68006	-94.97575	Transitory and Communal Roosts	West Bank of Missouri
62	1/31/2007	748.5	Missouri River, Kansas/Missouri	39.68662	-94.96901	Transitory and Communal Roosts	Within 100 feet of ROW
63	1/31/2007	748.5	Missouri River, Kansas/Missouri	39.68863	-94.96837	Transitory and Communal Roosts	Within 100 feet of ROW

Table 2 Bald Eagle Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number"	Survey Date	Milepost	Waterbody Name	Coordinates		Observation	Comments
				Latitude	Longitude		
64	1/31/2007	748.5	Missouri River, Kansas/Missouri	39.70020	-94.96673	Transitory and Communal Roosts	
20	1/31/2007	958.0	West Fork Cuivre River, Missouri	39.02718	-91.19027	Communal Roost	
17	1/31/2007	982.1	Cuivre River, Missouri	38.91706	-90.78275	Communal Roost	
18	1/31/2007	983.4	Cuivre River, Missouri	38.92089	-90.76623	Communal Roost	
14	1/30/2007	985.7	Cuivre River, Missouri	38.90206	-90.72111	Nest	Adult Bald Eagle on nest
15	1/30/2007	985.7	Cuivre River, Missouri	38.90127	-90.72394	Nest	Partially collapsed nest
16	1/30/2007	987.1	Cuivre River, Missouri	38.89066	-90.69614	Communal Roost	
13	1/30/2007	989.1	Cuivre River, Missouri	38.88929	-90.65569	Communal Roost	Immature and adult
12	1/30/2007	989.2	Cuivre River and Missouri River floodplains, Missouri	38.87985	-90.65984	Nest	West side of drainage
11	1/30/2007	996.7	Cuivre River, Missouri	38.86234	-90.53571	Communal Roost	Immature and adult
10	1/30/2007	1018.0	Missouri River, Missouri	38.82782	-90.16287	Communal Roost	Immature and adult
6	1/30/2007	1019.0	Mississippi River, Missouri/Illinois	38.85833	-90.13882	Communal Roost	West Bank of Mississippi
5	1/30/2007	1019.7	Mississippi River, Missouri/Illinois	38.85685	-90.13365	Communal Roost	West Bank of Mississippi
4	1/30/2007	1020.0	Mississippi River, Missouri/Illinois	38.85199	-90.12277	Communal Roost	West Bank of Mississippi

Table 2 Bald Eagle Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number"	Survey Date	Milepost	Waterbody Name	Coordinates		Observation	Comments
				Latitude	Longitude		
3	1/30/2007	1020.5	Mississippi River, Missouri/Illinois	38.84280	-90.11214	Communal Roosts and Winter Concentration	Over 300 mature and immature Bald Eagle on west bank of Mississippi
7	1/30/2007	1021.0	Mississippi River, Missouri/Illinois	38.81789	-90.11915	Nest	Historic nest on west bank in Confluence Park
8	1/30/2007	1021.0	Mississippi River, Missouri/Illinois	38.80220	-90.12317	Communal Roost	West bank of Mississippi River
9	1/30/2007	1021.0	Mississippi River, Missouri/Illinois	38.80732	-90.12230	Nest	Alternate nest on island on west side south of Confluence Park
CUSHING EXTENSION							
86	2/1/2007	4.1	Little Blue River, Kansas	39.96245	-96.98916	Transitory Roost?	2 adults and 1 immature flushed within 1 mile of ROW, south bank
87	2/1/2007	9.7	Mill Creek, Kansas	39.89604	-96.99945	Transitory Roost?	1 adult flushed
88	2/1/2007	13.2	Mill Creek, Kansas	39.84524	-96.99791	Transitory Roost?	1 adult flushed
92	2/1/2007	51.2	Republican River, Kansas	39.30041	-97.04312	Transitory Roost?	2 adults flushed
93	2/1/2007	51.2	Republican River, Kansas	39.29891	-97.03385	Transitory Roost?	1 adult flushed
97	2/1/2007	75.8	Smoky Hill River, Kansas	38.94875	-97.02326	Transitory Roost?	1 adult flushed
96	2/1/2007	76.2	Smoky Hill River, Kansas	38.94168	-97.03362	Nest	within .5 mile of ROW
108	2/1/2007	205.8	Arkansas River, Oklahoma	37.09230	-97.09605	Communal Roost?	3 adults, 2 immature flushed
109	2/1/2007	206.4	Arkansas River, Oklahoma	37.07989	-97.08533	Communal Roost?	
110	2/1/2007	206.4	Arkansas River, Oklahoma	37.08064	-97.07755	Communal Roost?	
111	2/1/2007	206.4	Arkansas River, Oklahoma	37.08948	-97.08999	Communal Roost?	

Table 2 Bald Eagle Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number"	Survey Date	Milepost	Waterbody Name	Coordinates		Observation	Comments
				Latitude	Longitude		
113	2/1/2007	238.7	Salt Fork Arkansas, Oklahoma	36.62217	-97.11750	Transitory Roost?	2 adults and 1 immature at confluence of Salt Fork and Bois 'd Arc River
114	2/1/2007	241.2	Salt Fork Arkansas, Oklahoma	36.58528	-97.11368	Transitory Roost?	1 adult flushed
118	2/1/2007	281.5	Cimarron River	36.06076	-96.81903	Roost	2 roosting eagles 1.5 to 4 miles downstream of ROW crossing on river
117	2/1/2007	282.2	Cimarron River	36.05167	-96.74002	Roost	2 roosting eagles 1.5 to 4 miles downstream of ROW crossing on river
115	2/1/2007	285.3	Cimarron River	36.01183	-96.82281	Nest	collapsed nest within 1 mile of ROW

Table 3 Raptor Nest Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number	Date	Milepost	Species[1]	Coordinates		State	Nest Type and Condition	Activity Status and Behavior	Habitat	Comments
				Latitude	Longitude					
KEYSTONE MAINLINE										
145	2/4/2007	7.4	BAEA	48.89004	-97.95688	ND	stick/good	2 adult GOEA roosting on N. bank of Pembina w/in 100 feet of ROW, 1 immature GOEA seen in area. May be using BAEA nest.	Riparian	Historic nest within 1/2 mile of ROW S. side near bluff
144	2/4/2007	24.7	RTHA	48.65172	-97.91902	ND	stick/good		Shelterbelt	
143	2/4/2007	56.7	CORVID/ACCIPITER	48.19162	-97.92008	ND	stick/poor		Riparian	Main branch of Forest Creek
142	2/4/2007	57.7	CORVID/ACCIPITER	48.17776	-97.92092	ND	stick/fair		Shelterbelt	0.25 mile north of main branch Forest Creek
140	2/3/2007	143.1	RTHA	46.9773	-97.91886	ND	stick/good		Shelterbelt	
141	2/4/2007	143.1	RTHA	46.97764	-97.91868	ND	stick/good		Shelterbelt	
139	2/3/2007	147.5	SWHA/RTHA	46.91298	-97.91822	ND	stick/fair		Shelterbelt	S. of the way
138	2/3/2007	149.0	SWHA	46.89228	-97.91849	ND	stick/fair		Shelterbelt	
137	2/3/2007	244.5	RTHA	45.5559	-97.92918	SD	stick/fair		Isolated clumps of trees in agricultural field	
136	2/3/2007	266.0	CORVID/ACCIPITER	45.23278	-97.96027	SD	stick/fair		Shelterbelt	
135	2/3/2007	270.5	RTHA?	45.17793	-97.96658	SD	stick/fair		Shelterbelt	
134	2/3/2007	289.5	ACCIPITER	44.91035	-97.9272	SD	stick/fair		Shelterbelt	Had squirrel in it
133	2/3/2007	303.7	SWHA?	44.70637	-97.937	SD	stick/good		Shelterbelt	
147	9/14/2006	435.5	OSPR	42.5196	-97.2257	SD	Hack		Riparian	Active Hack Site ~ 450 Ft from ROW
146	9/14/2006	435.5	OSPR	42.5196	-97.2262	SD	Hack		Riparian	Active Hack Site ~ 750 Ft from ROW
132	2/2/2007	456.6	RTHA	42.57677	-97.33344	NE	stick/good		Riparian	On Bow Creek
130	2/2/2007	460.8	RTHA	42.51871	-97.33836	NE	stick/poor		Woodlot	Partially collapsed
131	2/2/2007	460.8	RTHA	42.51894	-97.33882	NE	stick/fair		Woodlot	Located near #130

Table 3 Raptor Nest Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number	Date	Milepost	Species[1]	Coordinates		State	Nest Type and Condition	Activity Status and Behavior	Habitat	Comments
				Latitude	Longitude					
129	2/2/2007	463.6	CORVID	42.47932	-97.33819	NE	stick/good		Shelterbelt	
127	2/2/2007	508.0	RTHA	41.8527	-97.25664	NE	stick/good		Woodlot	Another small nest (Corvid?) to SW of this nest
128	2/2/2007	508.0	RTHA	41.85441	-97.25676	NE	stick/good		Woodlot	
126	2/2/2007	567.0	RTHA	41.02926	-97.14567	NE	stick/good		Single Tree	on Trib. To Big Weedy
125	2/2/2007	572.7	CORVID/ACCIPITER	40.94873	-97.13012	NE	stick/good		Riparian	Small nest on old oxbow to Big Blue River
124	2/2/2007	575.6	RTHA	40.90822	-97.12656	NE	stick/good		Riparian	
123	2/2/2007	602.6	RTHA	40.52959	-97.07561	NE	stick/good		Riparian	
122	2/2/2007	605.6	RTHA	40.49122	-97.05729	NE	stick/good		Riparian	
121	2/2/2007	606.8	RTHA	40.48806	-97.05574	NE	stick/good	GHOW flushed in area	Riparian	Trib. N. Dry Creek
120	2/2/2007	609.5	CROW/ACCIPITER	40.43261	-97.05552	NE	stick/fair		Shelter Belt	Near Plummer's Branch
119	2/2/2007	633.0	RTHA	40.09897	-97.00079	NE	stick/good		Riparian in ag field	
85	2/1/2007	649.2	RTHA	40.00376	-96.78083	NE	stick/good		Drainage	
84	2/1/2007	651.0	ACCIPITER	39.99936	-96.74863	KS	stick/fair		Woodlot	S. Side of ROW
82	1/31/2007	659.0	BAEA	39.97165	-96.60685	KS	stick/good		Big Blue River riparian	In Heron Rookery within 1 mile of ROW
80	1/31/2007	662.1	RTHA	39.96577	-96.54302	KS	stick/good		Riparian	Near N. Elm Creek
81	1/31/2007	662.1	ACCIPITER	39.96570	-96.54333	KS	stick/poor		Riparian	Near N. Elm Creek in adjacent tree/ old squirrel nest that has been converted
79	1/31/2007	688.5	GHOW	39.87327	-96.06640	KS	stick/good		Woodlot	2 eggs in nest
77	1/31/2007	695.9	ACCIPITER/RTHA	39.84830	-95.93141	KS	stick/good		Pasture	
76	1/31/2007	702.5	COHA /RTHA?	39.82965	-95.80144	KS	stick/good		Woodlot	
75	1/31/2007	710.4	ACCIPITER	39.80771	-95.66351	KS	stick/good		Woodlot	
74	1/31/2007	715.3	ACCIPITER	39.79470	-95.57180	KS	stick/good		Woodlot	
72	1/31/2007	716.5	HERON?	39.79110	-95.54973	KS	2 stick/good			2 nests
73	1/31/2007	716.5	HERON?	39.79098	-95.55028	KS	2 stick/1 good/1 poor		Riparian	2 nests, 1 very poor
71	1/31/2007	722.9	ACCIPITER	39.77101	-95.43686	KS	1 nest/poor		Woodlot/Riparian	

Table 3 Raptor Nest Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number	Date	Milepost	Species[1]	Coordinates		State	Nest Type and Condition	Activity Status and Behavior	Habitat	Comments
				Latitude	Longitude					
70	1/31/2007	727.8	ACCIPITER	39.75562	-95.34339	KS	1 nest/fair		Woodlot	In crook of tree
69	1/31/2007	741.8	ACCIPITER	39.71109	-95.08937	KS	2 nests/fair		Riparian	In adjacent trees (2)
67	1/31/2007	743.0	ACCIPITER	39.70633	-95.06953	KS	stick/good		Riparian/Woodlot	In crook of tree
68	1/31/2007	743.0	ACCIPITER	39.70616	-95.06960	KS	stick/good			
66	1/31/2007	745.0	ACCIPITER/GHOW	39.70047	-95.03323	KS	stick/fair		Riparian	
65	1/31/2007	745.9	ACCIPITER/GHOW	39.69752	-95.01596	KS	stick/fair		Woodlot	In crook of tree
57	1/31/2007	755.0	ACCIPITER	39.67197	-94.84998	MO	stick/fair		Shelter belt	Located within 100' of #58
58	1/31/2007	755.0	ACCIPITER	39.67193	-94.84995	MO	stick/poor		Shelter belt	Located within 100' of #57
56	1/31/2007	760.9	ACCIPITER	39.65425	-94.74888	MO	stick/poor		Riparian	On Pigeon Creek
55	1/31/2007	774.6	RTHA	39.62833	-94.49520	MO	stick/good		Riparian	
54	1/31/2007	777.5	RTHA/COHA	39.62279	-94.44320	MO	stick/fair		Riparian	
53	1/31/2007	779.0	RTHA	39.62207	-94.41361	MO	stick/good		Riparian	Near Horse Creek
51	1/31/2007	786.2	GHOW	39.60495	-94.27823	MO	stick/poor		Pasture/Shelter belt	Has whitewash
52	1/31/2007	786.2	ACCIPITER	39.60585	-94.27956	MO	stick/poor		Riparian	Bottom of drainage
50	1/31/2007	791.8	ACCIPITER	39.59670	-94.17699	MO	stick/poor		Shelter belt on drainage	N. side of ROW
49	1/31/2007	794.6	RTHA	39.59057	-94.12347	MO	stick/good		Woodlot	
48	1/31/2007	803.6	UNK	39.56936	-93.95668	MO	stick/poor		On edge of ROW	
47	1/31/2007	814.2	ACCIPITER	39.54732	-93.76363	MO	stick/fair		Shelter Belt/Hedgerow	
46	1/31/2007	815.9	ACCIPITER	39.54381	-93.73452	MO	stick/poor		Woodlot	S. of Lyon School
42	1/31/2007	826.4	ACCIPITER	39.52520	-93.53956	MO	stick/poor		Woodlot	Multiple stick nests - coordinates provided are for one closest to ROW
43	1/31/2007	826.4	ACCIPITER	39.52492	-93.53937	MO	stick/poor		Woodlot	Multiple stick nests - coordinates provided are for one closest to ROW
44	1/31/2007	826.4	ACCIPITER	39.52501	-93.54011	MO	stick/poor		Woodlot	Multiple stick nests - coordinates provided are for one closest to ROW
45	1/31/2007	826.4	ACCIPITER	39.52562	-93.54237	MO	stick/poor		Woodlot	Multiple stick nests - coordinates provided are for one closest to ROW
41	1/31/2007	828.3	ACCIPITER	39.52023	-93.50185	MO	stick/poor		Edge of woodlot	

Table 3 Raptor Nest Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number	Date	Milepost	Species[1]	Coordinates		State	Nest Type and Condition	Activity Status and Behavior	Habitat	Comments
				Latitude	Longitude					
39	1/31/2007	830.1	HERON ROOKERY	39.51718	-93.46981	MO	multiple stick/good		In Sycamore trees	4 trees with nests, S. tree in ROW
40	1/31/2007	830.1	UNK	39.51630	-93.46959	MO	stick/poor		In SycamoreTrees	
38	1/31/2007	833.7	SWHA?	39.50698	-93.40516	MO	stick/good		Tributary to Wolf Branch	
37	1/31/2007	837.1	RTHA	39.49891	-93.34055	MO	stick/good		Little Hurricane Creek	
36	1/31/2007	837.6	UNK/GHOW?	39.49824	-93.33308	MO	stick/poor		Shelter Belt	
35	1/31/2007	840.5	RTHA	39.49314	-93.27746	MO	stick/good		West side of Grand River	Large tree on ROW
31	1/30/2007	842.8	RTHA?	39.48820	-93.23568	MO	stick/good		Woodlot	Potter's Slough
32	1/30/2007	842.8	ACCIPITER	39.48916	-93.23633	MO	stick/poor		Woodlot	Potter's Slough
34	1/31/2007	852.2	COHA	39.47015	-93.05889	MO	stick/fair		Woodlot	Near corral
30	1/30/2007	854.7	RTHA/GHOW	39.46451	-93.01526	MO	stick/good		Pasture	In pasture in fork of single tree
29	1/30/2007	856.1	RTHA	39.45990	-92.98989	MO	stick/good		Woodlot	
28	1/30/2007	867.2	ACCIPITER	39.40450	-92.80046	MO	stick/poor		Woodlot	Lower in tree - S. edge of cleared ROW
27	1/30/2007	875.0	ACCIPTER	39.38511	-92.65791	MO	stick/good		Woodlot	N. side of ROW
26	1/30/2007	879.8	ACCIPTER	39.37111	-92.57157	MO	stick/good		Woodlot	S. side of ROW
25	1/30/2007	881.3	ACCIPTER	39.36664	-92.54029	MO	stick/poor		Woodlot	S. side of ROW
33	1/31/2007	883.3	ACCIPITER (SSHA?)	39.36011	-92.50685	MO	small stick/good		Woodlot	Raven or Crow
24	1/30/2007	916.7	ACCIPTER/GHOW	39.22373	-91.91204	MO	stick/good		Woodlot	Skull Lick Creek
23	1/30/2007	921.7	RTHA	39.19870	-91.82324	MO	stick/good		Edge of Woodlot	
22	1/30/2007	952.6	RTHA	39.04921	-91.28434	MO	stick/good	adult incubating	Woodlot	1 egg in nest; very early nest attempt; Brush Creek
21	1/30/2007	955.0	RTHA	39.03735	-91.24196	MO	stick/good		Copper Fork of Sycamore	Bear Creek
19	1/30/2007	978.3	RTHA	38.94032	-90.84788	MO	stick/good		South bell	Shelter on ROW
14	1/30/2007	985.7	BAEA	38.90206	-90.72111	MO	stick/good occupied	adult in nest	Cuivre River oxbow	Good nest w/BAEA roosting in it

Table 3 Raptor Nest Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number	Date	Milepost	Species[1]	Coordinates		State	Nest Type and Condition	Activity Status and Behavior	Habitat	Comments
				Latitude	Longitude					
15	1/30/2007	985.7	BAEA	38.90127	-90.72394	MO	stick/poor		Cuivre River oxbow	May be heron nest, partially collapsed
78	1/31/2007	988.5	GHOW/RTHA	39.87373	-96.06604	KS	stick/good		Woodlot	
12	1/30/2007	989.2	BAEA	38.87985	-90.65984	MO	stick/good large	BAEA in area	W. side of drainage	Cuivre and Missouri River floodplains
7	1/30/2007	1021.0	BAEA	38.81789	-90.11915	MO	stick/good large	numerous ages of BAEA in area	W. side Confluence Park on Mississippi River	Potential BAEA nest - large tree facing open water
9	1/30/2007	1021.0	ALT. BAEA	38.80732	-90.12230	MO	stick/good large	BAEA in area	W. side of island S. of Confluence Park	Potential alternative to # 007
2	1/30/2007	1030.8	RTHA	38.82940	-89.94724	IL	stick/good		Woodlot	Near Cahokia Diversion Channel
1	1/30/2007	1032.7	ACCIPITER	38.82525	-89.90986	IL	stick/poor		Woodlot	Sugar Creek
CUSHING EXTENSION										
89	2/1/2007	46.4	RTHA	39.36866	-97.04131	KS	stick/good	2 adults perched in area	Cottonwood in pasture	2 adults roosting adjacent
90	2/1/2007	49.0	ACCIPITER	39.33170	-97.04923	KS	stick/fair		Riparian	
91	2/1/2007	50.1	ACCIPITER	39.31762	-97.04931	KS	stick/fair		Milford Wildlife Area	
94	2/1/2007	60.0	ACCIPITER	39.17368	-97.05032	KS	stick/poor		Riparian	
95	2/1/2007	70.7	ACCIPITER	39.02141	-97.05235	KS	stick/fair		Riparian	Tributary To Chapman Creek
96	2/1/2007	76.2	BAEA	38.94168	-97.03362	KS	stick/good		Cottonwood/ riparian	Smoky Hill River, approximately 0.5 mile from ROW (E)
98	2/1/2007	87.0	GHOW	38.78728	-97.04017	KS	stick/good	Active/Incubating	Riparian	Adult on nest on Camp Creek
99	2/1/2007	116.4	RTHA	38.36486	-97.04596	KS	stick/good		Riparian	N. of Hwy 6
100	2/1/2007	159.8	CROW/ACCIPITER	37.74183	-97.01512	KS	stick/good		Riparian	on Badger Creek
101	2/1/2007	172.5	CROW/UNK	37.56267	-97.04677	KS	stick/good		Woodlot	May be crow, multiple nests together (4-6)
102	2/1/2007	177.7	CROW/UNK	37.48704	-97.05302	KS	stick/good		Shelterbelt	
103	2/1/2007	181.8	CROW/UNK	37.42715	-97.05109	KS	stick/good		Woodlot	In crook of tree

Table 3 Raptor Nest Survey Results – Keystone Pipeline Project – January 29 to February 4, 2007

Waypoint Number	Date	Milepost	Species[1]	Coordinates		State	Nest Type and Condition	Activity Status and Behavior	Habitat	Comments
				Latitude	Longitude					
104	2/1/2007	185.5	HERON	37.37278	-97.05151	KS				Rookery
105	2/1/2007	185.5	HERON	37.37476	-97.05153	KS				Rookery
106	2/1/2007	185.5	HERON	37.37409	-97.05231	KS			Riparian	Rookery (closest to ROW)
107	2/1/2007	185.5	HERON	37.37330	-97.05163	KS	stick/good		Stewart Creek	Rookery
112	2/1/2007	235	ACCIPITER	36.66531	-97.12893	OK	stick/good		Bois 'd Arc Creek Riparian	E. side of creek
115	2/1/2007	285.3	BAEA	36.01183	-96.82281	OK	stick/poor		Cottonwood	Arkansas, collapsed large nest approximately 1 mile downstream
116	2/1/2007	290.5	ACCIPITER	35.96451	-96.77279	OK	stick/good		Woodlot	Near end of Cushing line

[1]Species abbreviations:

AMKE = American kestrel

BAEA = bald eagle

GOEA = golden eagle

RTHA = red-tailed hawk

SWHA = Swainson's hawk

COHA = Cooper's hawk

PRFA = prairie falcon

GHOW = great horned owl

NOHA = northern harrier

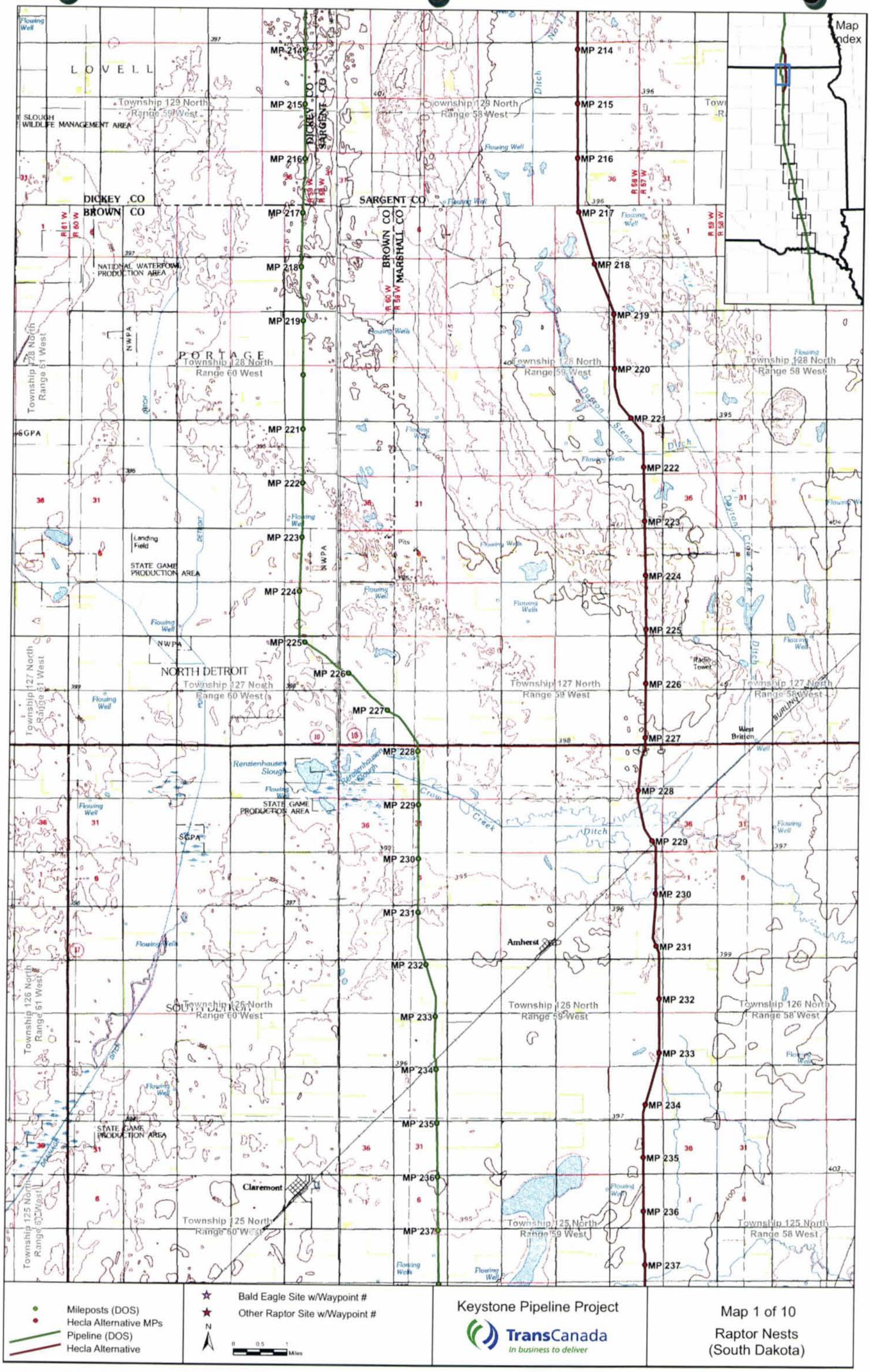
OSPR = osprey

RSHA = red-shouldered hawk

UNK = unknown

CORVID = Raven or Crow

ACCIPITER = COHA or SSHA



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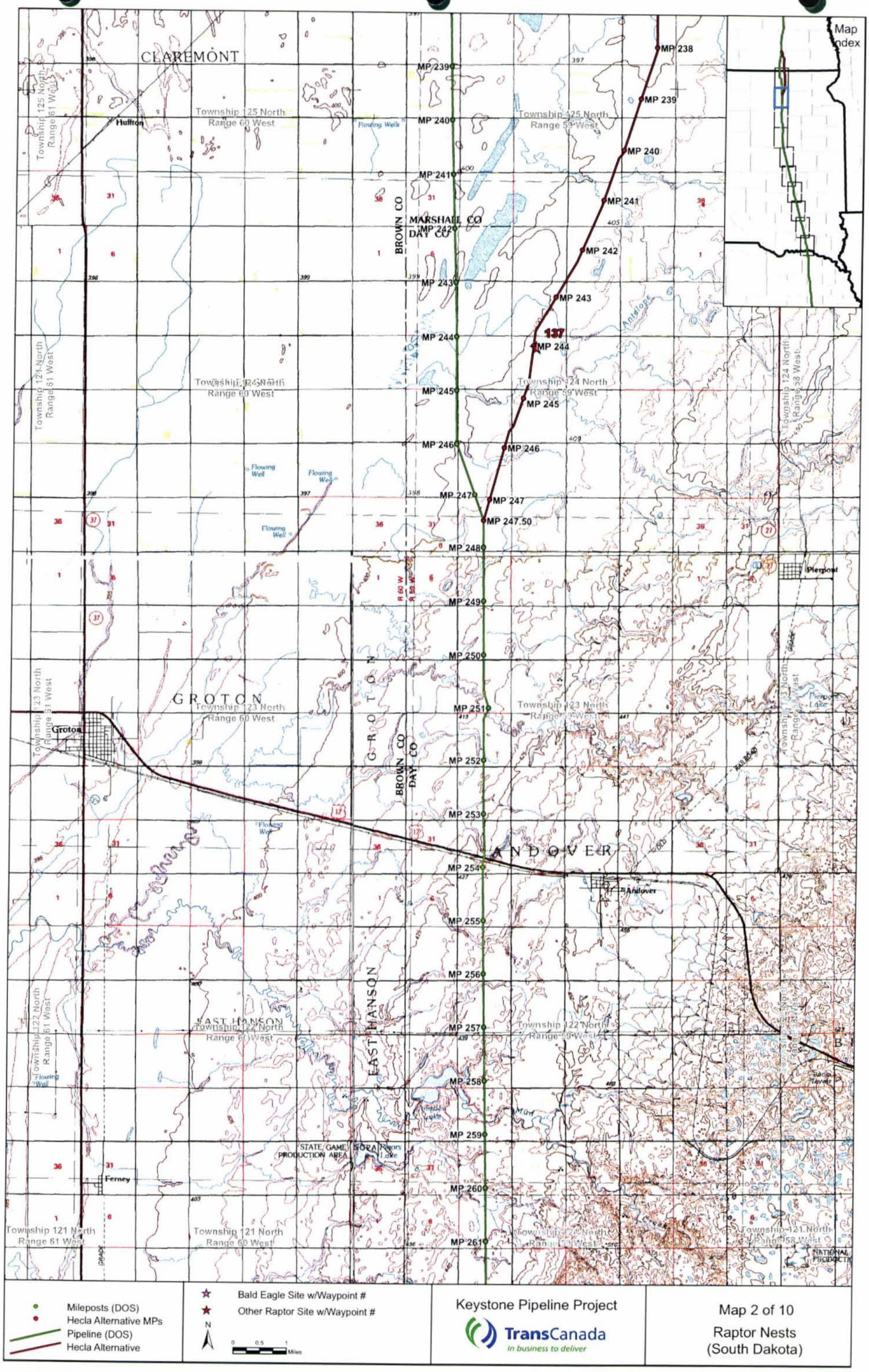

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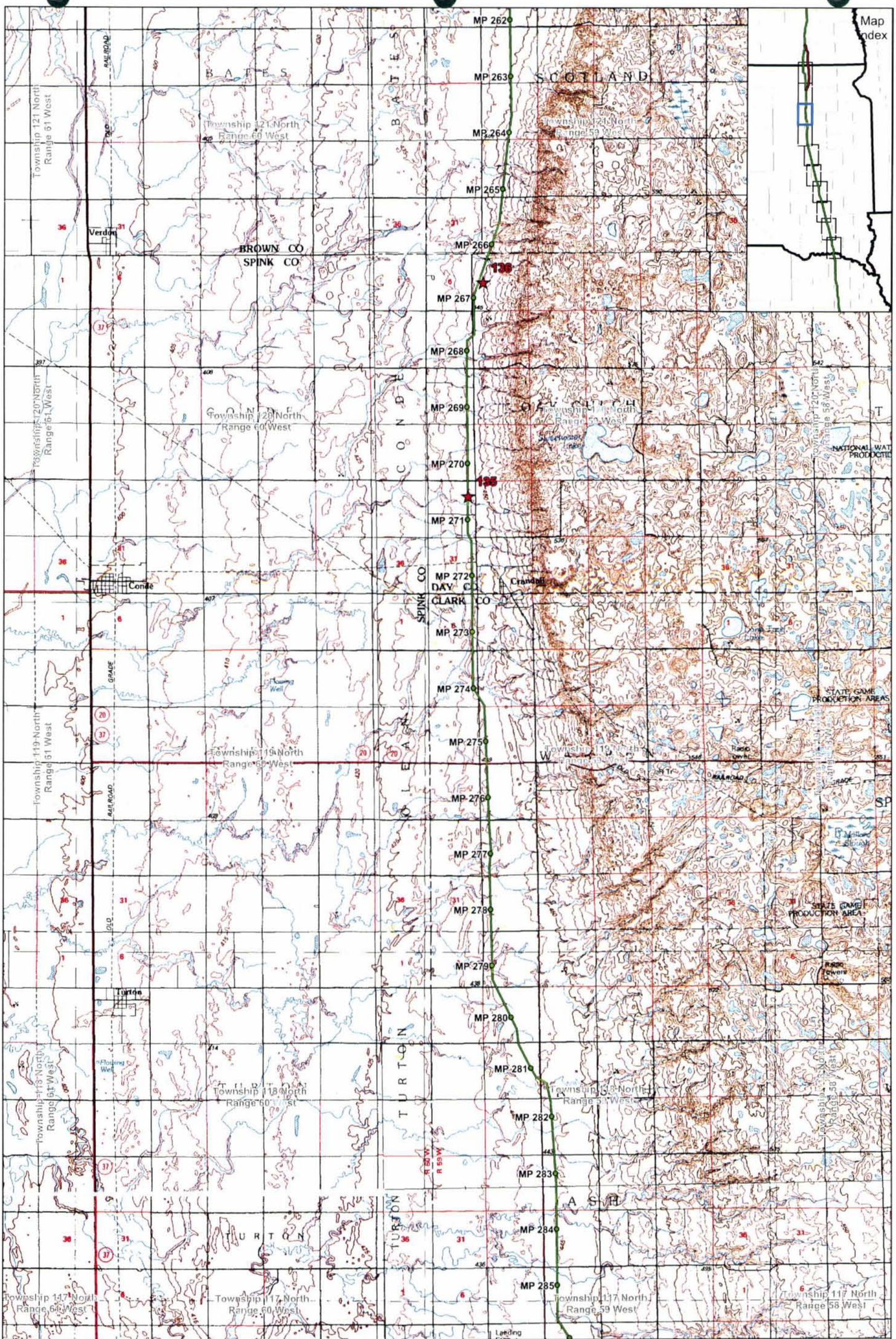

Mileposts (DOS)
Hecla Alternative MPs
Pipeline (DOS)
Hecla Alternative

Bald Eagle Site w/Waypoint #
Other Raptor Site w/Waypoint #

N

0 0.5 1 Miles

Keystone Pipeline Project

TransCanada
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Map 3 of 10

Raptor Nests
(South Dakota)

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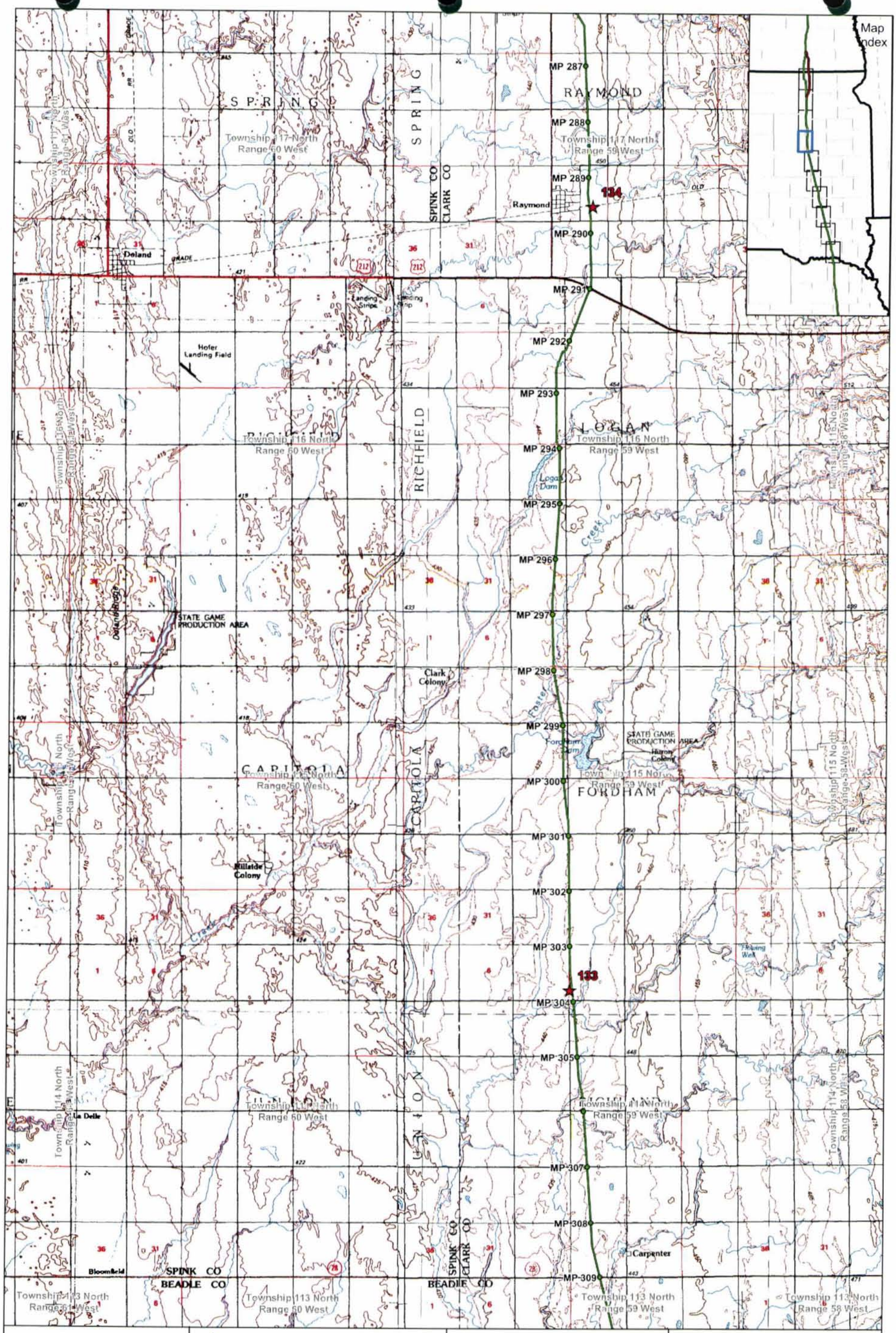

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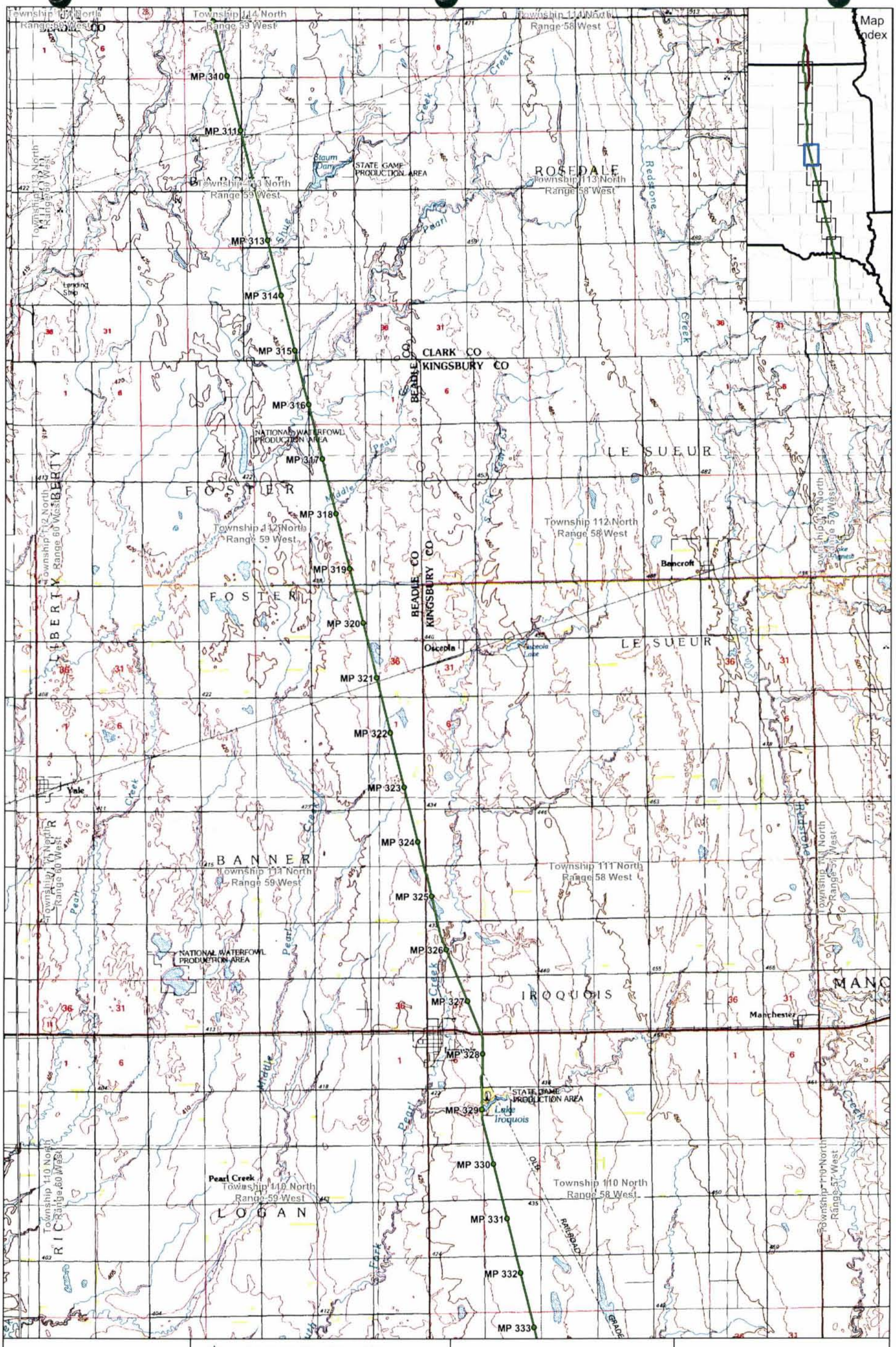

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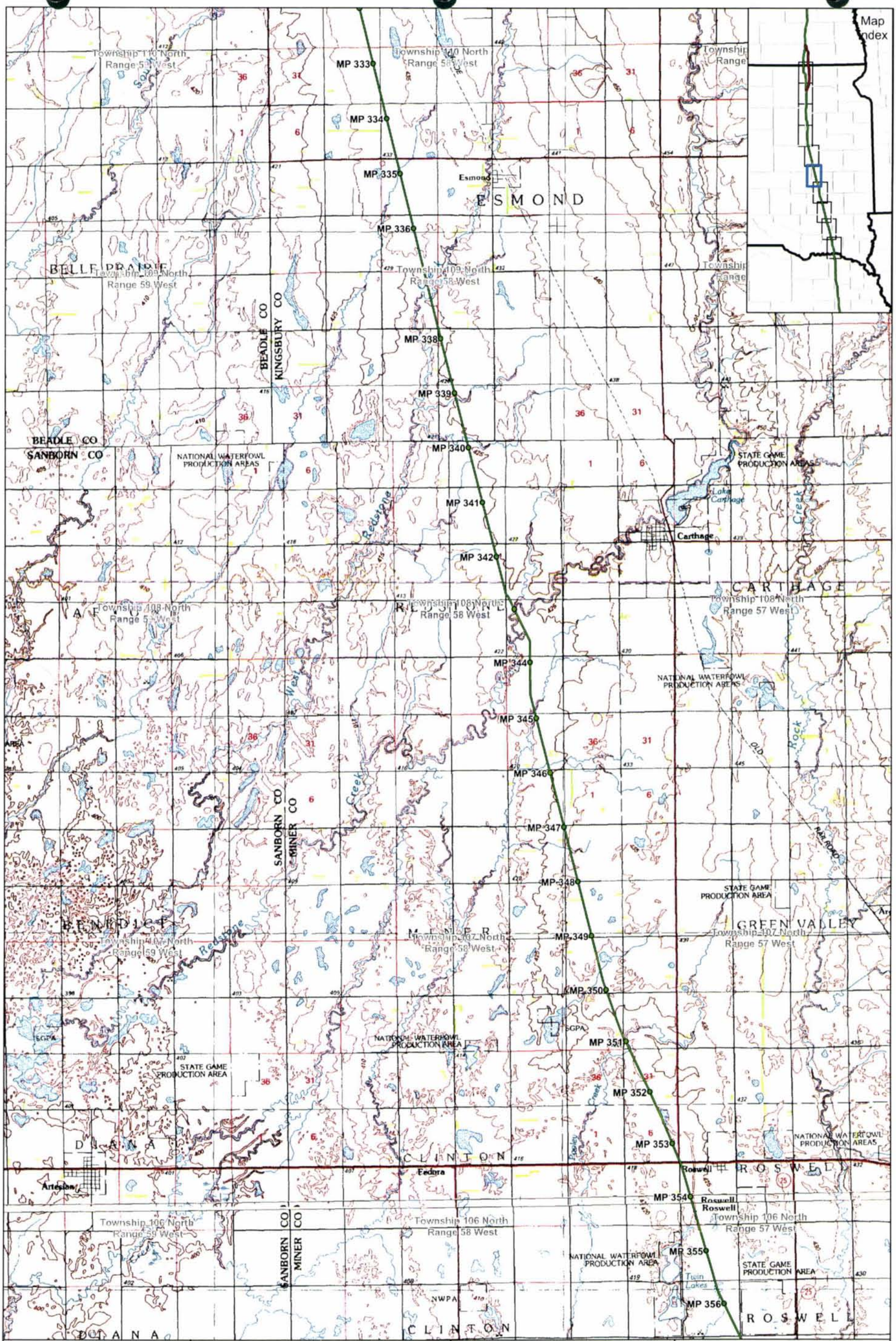

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Township 107 North
Range 58 West

Township 107 North
Range 57 West

Township 107 North
Range 56 West

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CLINTON
ROSWELL
HOWA
Fedora
Roswell
Roswell
Roswell
Vilas
Vilas
NATIONAL WATERFOWL PRODUCTION AREAS
NATIONAL WATERFOWL PRODUCTION AREA
STATE GAME PRODUCTION AREA
Twin Lakes
NWPA
O'Neal Lake
Township 106 North
Range 58 West
Township 106 North
Range 57 West
Township 10
Range 56
Bitter Lake
Flowing Well
Glee Lake
House Lake
Township 105 North
Range 58 West
Township 105 North
Range 57 West
Township 105 North
Range 56 West
BEAVER
ROSCOE
HAMLIN
Epiphany
MINER CO
HANSON CO
MCCOOK CO
Lutz Lake
Spring Lake
Township 104 North
Range 58 West
Township 104 North
Range 57 West
Township 104 North
Range 56 West
FAIRVIEW
SPRING LAKE
HAMLIN
Township 103 North
Range 58 West
Township 103 North
Range 57 West
Township 103 North
Range 56 West
JASPER
EDGERTON
BENTON
Farmer
Spencer
Radio Tower
Lake Eli
GRADE
OLD

Mileposts (DOS)
Hecla Alternative MPs
Pipeline (DOS)
Hecla Alternative
Bald Eagle Site w/Waypoint #
Other Raptor Site w/Waypoint #
N
0 0.5 1 Miles

Keystone Pipeline Project
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Map 7 of 10
Raptor Nests
(South Dakota)

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MP 375
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MP 397
MP 398

Township 103 North
Range 57 West

Township 103 North
Range 56 West

Township 102 North
Range 57 West

Township 102 North
Range 58 West

Township 102 North
Range 56 West

Township 102 North
Range 55 West

Township 101 North
Range 58 West

Township 101 North
Range 57 West

Township 101 North
Range 56 West

Township 101 North
Range 55 West

Township 100 North
Range 58 West

Township 100 North
Range 57 West

Township 100 North
Range 56 West

Township 99 North
Range 58 West

Township 99 North
Range 57 West

Township 99 North
Range 56 West

Schimmel Slough
Tuscher Slough
Lehman Slough
Gross Land
Weiker Lake
Forsch Lake
Lions Lake
Wolf Creek
Plum Creek
Elm Creek
Tschetter Slough
Weimer Richards Landing Strip
Bridgewater
Empey
Clayton
River

NWPA
STATE GAME PRODUCTION AREA
NATIONAL WATERFOWL PRODUCTION AREAS

HANSON CO
MC COOK CO
HUTCHINSON CO

PLEASANT
BRIDGEWATER
LAKE
CLAYTON
WOLF CREEK
GRANDVIEW

Map Index

Mileposts (DOS)
Hecla Alternative MPs
Pipeline (DOS)
Hecla Alternative

Bald Eagle Site w/Waypoint #
Other Raptor Site w/Waypoint #

N

0 0.5 1 Miles

Keystone Pipeline Project

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In business to deliver

Map 8 of 10

Raptor Nests
(South Dakota)

X:\0Projects\10623_004_Keystone\Mapbook_Raptors_Spring_2007\mapbook_Raptors2007_SD_tw.mxd

Township 100 North
Range 57 West

Township 100 North
Range 56 West

MP 395
MP 396
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MP 398
MP 399
MP 400
MP 401
MP 402
MP 403
MP 404
MP 405
MP 406
MP 407
MP 408
MP 409
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MP 412
MP 413
MP 414
MP 415
MP 416
MP 417
MP 418
MP 419

WOLF CREEK
GRANDVIEW
KASSEL VALLEY
GLENDALE
JAMESVILLE
MIDLAND

Township 99 North
Range 57 West

Township 99 North
Range 56 West

Township 98 North
Range 57 West

Township 98 North
Range 56 West

Township 98 North
Range 55 West

Township 97 North
Range 57 West

Township 97 North
Range 56 West

Township 97 North
Range 55 West

Township 96 North
Range 57 West

Township 96 North
Range 56 West

Township 96 North
Range 55 West

STATE GAME PRODUCTION AREA

Freeman

Menno

Wolf Creek Colony

Sewage Disposal

Radio Towers

Ulmen Lake

Guthmiller Lake

Jamesville Colony

Midway

Lake Menno

Furlong Creek

Old RAILROAD GRADE

James River

Clover Creek

Mud Creek

Map Index

HUTCHINSON CO

TURNER CO

Mileposts (DOS)
Hecla Alternative MPs
Pipeline (DOS)
Hecla Alternative

Bald Eagle Site w/Waypoint #
Other Raptor Site w/Waypoint #

N

0 0.5 1 Miles

Keystone Pipeline Project

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In business to deliver

Map 9 of 10

Raptor Nests
(South Dakota)

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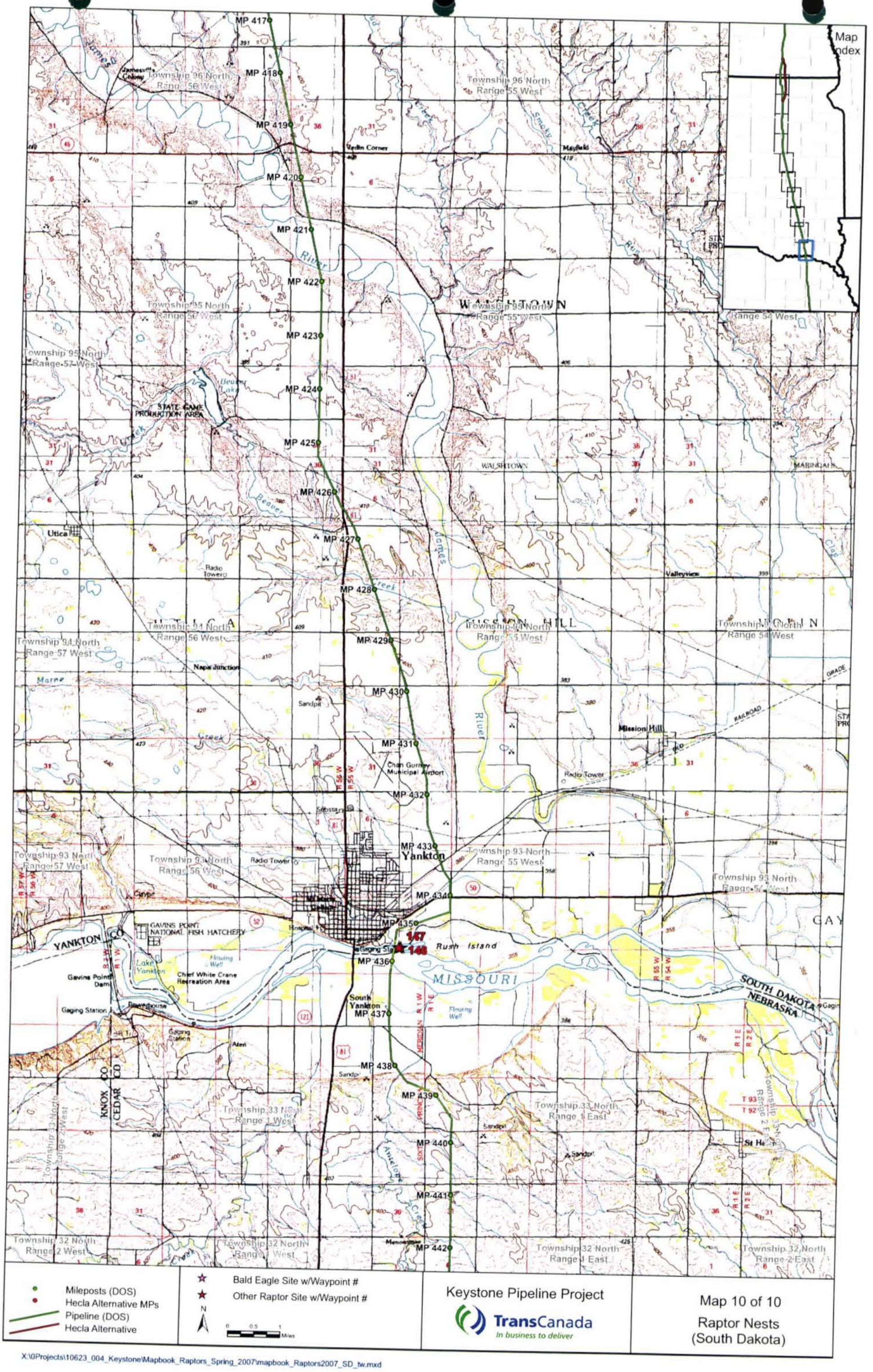

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ENSR

Prepared for:
Keystone Pipeline Project

A Field Survey of the Keystone Pipeline Project Construction Corridor in North and South Dakota for Dakota Skipper (*Hesperia dacotae*) Habitat, Western Prairie Fringed Orchid (*Platanthera praeclara*) Habitat, and for Native Grassland

ENSR Corporation
October 2006
Document No.: 10623-004

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Executive Summary

A field survey was conducted along the proposed Keystone Pipeline Project construction right-of-way for native grassland habitat and for native grassland species. The target native grassland species were western prairie fringed orchid (*Platanthera praeclara*) and Dakota skipper butterfly (*Hesperia dacotae*). The survey was conducted by a two person team from September 11 to September 16, 2006. Survey sites were determined from aerial photograph and topographic map analysis along the proposed project route, and through consultation with federal and state agencies. A total of 38 sites were visited during the field survey. Of the 38 survey sites, four of the sites were determined not to be grassland. Of the remaining 34 survey areas, 10 were determined to be high quality grasslands, seven were determined to be medium quality grasslands, and 17 were determined to be low quality grasslands. Eight survey sites were identified as potential habitat for the Dakota skipper and eight were identified as potential habitat for the western prairie fringed orchid. It is recommended that these sites be surveyed in 2007 for the presence or absence of the target species. Photographs, detailed survey site summaries, survey location maps, and a species list can be found in the appendices of this report.

1.0 Introduction

The proposed Keystone Mainline enters Cavalier County, North Dakota, from Canada and continues south along the eastern portions of North Dakota, South Dakota, and Nebraska. The proposed pipeline route then turns east crossing Kansas and Missouri, and terminates in Marion County, Illinois. The Mainline objectives of this survey were as follows:

Objective 1. To determine areas along the corridor that are potential habitat for Dakota skipper (*Hesperia dacotae*), a butterfly that is designated as a federal candidate species.

Objective 2. To determine areas along the corridor that are potential habitat for western prairie fringed orchid (*Platanthera praeclara*), a plant that is federally listed as a threatened species.

Objective 3. To identify sections of the corridor with intact or partially intact native grassland.

The western prairie fringed orchid and Dakota skipper butterfly, hereafter referred to as the target species, both occur on native grassland areas. However, they occupy different types of grassland habitat. Therefore, any area designated as potential habitat for either target species also constitutes intact or partially native grassland. In contrast, there may be intact or partially intact native grassland areas that are not potential habitat for either of these two target species. In order to identify which native grassland areas are best suited for the two target species the following, background information on grassland and target species habitats was obtained.

Habitat Requirements for Dakota Skipper (*Hesperia dacotae*)

The literature consulted to determine Dakota skipper habitat included reports or articles by Vaughan and Shepherd (2005), Royer (1996), Schlicht (1997), and Dakota Skipper Conservation Guidelines from the U.S. Fish and Wildlife Service (USFWS 2005) in Bloomington, Minnesota. From these articles the following habitat summary was developed.

Dakota skipper habitat is native tall and mixed-grass prairie or prairie remnants where there are abundant larval and adult food-sources present. The two grassland habitats where this species is known to occur are: 1) low (wet) grassland dominated by bluestem grasses, wood lily, harebell, and smooth camas, and 2) upland (dry) grassland on ridges and hillsides dominated by bluestem grasses, needlegrass, pale purple and upright coneflowers and blanketflower. Since nectar provides the nutrients and carbohydrates for Dakota skippers to meet the energetic demands of flight, one of the best indicators for Dakota skipper habitat is the presence of Dakota skipper food plants for larva and nectar plants for adults. The Dakota skipper larva prefers little blue stem (*Schizachyrium scoparium*) roots as a nutrient source, but the larvae do not use this grass exclusively.

Preferred nectar plants for the adult Dakota skipper are purple coneflowers or black Sampson plants: *Echinacea angustifolia*. Other preferred nectar sources include a vetch (*Astragalus adsurgens*), hoary vervain (*Verbena stricta*), leadplant (*Amorpha canescens*), white prairie clover (*Dalea candida*), fleabane (*Erigeron* spp.), blanketflower (Gaillardia), black-eyed Susans (*Rudbeckia* sp.), yellow sundrops (*Calylophus serrulatus*) and purple locoweed (*Oxytropis lambertii*.) The Dakota skipper also is a generalist in regards to pollen collection, and it also is believed that the larvae can live on roots other than those of the little blue stem. Therefore, if a grassland site had both a diverse mix of native forbs, and only one or two of the known larvae or pollen plants, it was considered Dakota skipper habitat. Another important factor in determining suitable habitat is the proximity of other native grassland areas.

Habitat Requirements for Western Prairie fringed Orchid (*Platanthera praeclara*)

The western prairie fringed orchid occurs on tall-grass calcareous silt loam or sub-irrigated sandy grasslands. The largest known population of this orchid occurs on the Sheyenne National Grasslands in Ransom County, North Dakota. Therefore, all grassland wetland areas in Ransom County were considered to be potential habitat for this orchid. To obtain a better search image for the habitat where this orchid occurs, an area on the Sheyenne National Grassland where this orchid was known to occur about two months prior to this survey was visited. The following photos were taken on September 12, 2006, of the habitat where western prairie fringed orchid (*Platanthera praeclara*) was seen in July 2006. Note the mowing and bailing that has occurred since July.

Photo 1: Search image for western prairie fringed orchid habitat obtained at the Sheyenne National Grassland, Ransom County, North Dakota

Photo 2: Sheyenne National Grassland western prairie fringed orchid habitat located along roadside ditch

Photo 3: Bailing had occurred along the roadside ditch where the western prairie fringed orchid had been sighted in July 2006

Native Grassland Habitat in the Dakotas

Ecologists often divide the Great Plains grasslands into short, mid, and tallgrass prairie regions. These three grasslands are named on the basis of the average height of the dominant, native grass cover. The differences among these three grassland types also correspond to both the amount and seasonal distribution of annual precipitation. The shortgrass steppe area usually receives less than 30 centimeters (cm) of precipitation per year, most of which occurs in summer thunderstorm events. The mixed or mid-grass prairie regions usually receive more than 30 cm of precipitation per year (up to 50 or more), but compared to the shortgrass prairie, the mid-grass prairie receives more annual precipitation during the spring. This early season precipitation encourages more of the "cool-season" or C-3 photosynthetic pathway grass species (*Stipa, Agropyron, Kohleria*). Finally, the tallgrass prairie, sometimes referred to as "true prairie," occurs further east and typically receives over 50 cm of precipitation per year.

The grasslands of interest in this survey are mid-grass prairie and tallgrass prairie areas along the proposed Keystone Pipeline Project construction right-of-way (ROW) in eastern North and South Dakota. The mixed or mid-grass grasslands were once dominated by cool-season grasses such as needle-and-thread (*Stipa*), junegrass (*Kohleria macrantha*), western wheat grass (*Agropyron smithii*) and others. The tallgrass areas have taller species such as Indian grass (*Sorghastrum nutans*), and big blue stem (*Andropogon gerardii*). There is a transition region between mid- and tallgrass prairie that is sometimes evident in the few remaining grasslands in the eastern Dakotas.

The significance of conserving the remaining grassland areas becomes evident when a few statistics are cited regarding the extent to which our native grasslands have been converted to other land uses, especially to cropland and pastures. Sampson and Knoph (1994) reported that over 99 percent of the original tallgrass prairie in Iowa, Minnesota, and North Dakota has been destroyed by settlement and agriculture. It was not indicated how much mixed or mid-grass prairie remains in North Dakota, but it was estimated that in South Dakota, about 85 percent of the original 3 million acres of mixed-grass prairie has been converted to non-grassland uses. Jones and Cushman (2004) site that only 0.3 percent of the original tallgrass prairie and 1.8 percent of the original mixed-grass prairie remains in central North America.

2.0 Methods

Prior to field work, aerial photographs of the entire Keystone Pipeline Project route in North Dakota and South Dakota were studied to identify potential native grassland areas. Survey sites were selected with varying size, geographic location, and hypothesized habitat quality, to capture a wide array of grassland habitat that would be encountered along the pipeline route. Based on the aerial photograph analysis these sites were further categorized as low, medium, or high quality grasslands; categories that were to be verified in the field. Sites identified as high quality grasslands typically were areas that appeared to have native vegetation, steep slopes or hills, or were fairly large, or that were adjacent to larger areas of grassland outside of the pipeline corridor. Sites identified as medium quality grasslands were areas of moderate size, or appeared to be lightly or moderately grazed pastures, or have a mixture of planted and native vegetation. Low quality grasslands were areas of smaller size, or sites that appeared to have a majority of planted grass species, or heavily grazed pastures. This designation helped assure that a large variety of sites would be visited in the field, and that no major grassland areas would be missed during the field survey.

Seventeen sites were pre-selected for ground surveys. A ground survey consisted of walking a majority of the survey site, taking detailed field notes of the site, completing a data sheet outlining the dominant vegetation types, native plant species, invasive plant species, disturbance, and potential threatened and endangered species habitat, taking representative photos of the site, and collecting voucher specimens for further identification. Drive-by reconnaissance was conducted at the remaining grassland sites identified from the aerial photograph exercise. Drive-by reconnaissance also consisted of taking field notes of the site, and completing a data sheet, taking photographs and global positioning system coordinates from the roadside. All sites were analyzed for native grassland habitat quality, and potential target species habitat.

3.0 Results

Field surveys were conducted by Sara Stribley (ENSR biologist) and Don Hazlett (ENSR botanist) from September 11 to September 16, 2006. A total of 38 sites were surveyed during this timeframe. Of the 38 sites visited, detailed documentation was completed for 30 of the sites. A data sheet for each of these 30 sites was completed, which includes a plant species list and other notes that are unique to the site. Photographs were taken of each location that was identified as a "feature" and a unique feature number was assigned to each of 30 these sites. The eight sites that were not recorded as features were either non-grassland areas, or were very low quality grassland sites, similar to previous survey sites visited. Notes were taken on these eight sites, but detailed documentation for these areas was not necessary. Global positioning system (GPS) coordinates also were taken at a majority of the sites to ensure that the surveys were being conducted within the pipeline construction ROW.

A ground survey was conducted at 12 sites. Initially, 17 sites were selected for ground surveys. However, in the field, some of the original 17 sites turned out to be agriculture fields or very low quality pastures, that did not warrant a thorough ground examination.

A summary table was made for the sites that were visited during the field survey (**Table 1**). This table contains information on the feature number, survey date, start and end milepost, county, state, survey type (visit or drive-by), habitat quality designation, target species designation (or not), and a brief description of the site.

Color photographs (one or more for each feature), detailed site summaries, and survey location maps can be found in Appendix I.

A list of over 150 plant species that were identified during this field survey, including several noxious weed species can be found in Appendix II.

For each of the 38 locations, a determination was made if the site consisted of native grassland. If the site contained some or all native grassland, the next determination was made in regards to the quality of the grassland. The following summarizes the determinants used in the field to classify grassland quality at each site:

High Quality Grassland. This category was assigned only to large areas dominated by native grass, with special attention given to corridor areas that were adjacent to large tracts of native grassland. Further criteria required to obtain a high quality status was the presence of a relatively high diversity of native grasses (three or more) and of native forbs (four or more that were relatively common). Also, there must be few exotic, weedy plants to be ranked as high. Only 10 of the 38 sites that were viewed or visited obtained the rank of high quality grassland (**Table 1**).

Medium Quality Grassland. This rank was given to grassland that had a matrix vegetation of native plants, but that also had significant disturbance, such as moderate to high grazing or pockets of exotic weeds or pasture grass invasion. Of the 38 sites that were viewed or visited, 7 obtained the rank of medium quality grassland (**Table 1**).

Low Quality Grassland. Plowed cropland was not considered grassland. In addition, unplowed pastures that have been heavily grazed for a long period of time, or that have been planted with exotic pasture grasses to the extent that no native grasses can be found, were not considered grassland, even though some of these sites contained several weedy, native forbs (ex: Grindelia). The low quality grassland rank was given to sites with a few upland or sometimes ridge top areas with recognizable areas of native grasses and forbs. An area could be considered low quality grassland despite the dominance in some areas of the corridor by smooth brome or by other pasture grasses. Of the 38 areas that were viewed, 17 (nearly half) were given a rank of low quality grassland (**Table 1**).

None. In the field it was discovered that 4 of the 38 areas designated from the aerial photographs as grassland were actually grass-filled wetlands or croplands (grazed hayfield, etc.).

Dakota skipper habitat. After an area was categorized as a high, medium, or low quality grassland, it was then determined if this area also was suitable habitat for the Dakota skipper butterfly. Factors that were considered in this determination were: 1) if there was little blue stem present, a known larval food for the Dakota skipper; 2) if at least two of the known pollen source plants for the Dakota skipper were present; 3) if there was a diverse mix of native grasses and forbs; 4) if there was a large area of native prairie adjacent to the pipeline corridor; and 5) if the site was in the range of where this species could potentially occur.

Based on the above criteria 8 of the 34 grassland areas were designated as potential Dakota skipper habitat sites (**Table 2**). Seven of these potential Dakota skipper habitat locations were on areas designated as high quality prairie, and one was on an area designated as medium quality grassland.

Western prairie fringed orchid habitat. After an area was categorized as a high, medium, or low quality grassland, it was then determined if this area also was habitat for the western prairie fringed orchid. Factors that were considered in this determination were: 1) if it was possible for a grassland (of any quality) to be subirrigated, 2) subirrigation meant that there needed to be a wetland area nearby, 3) if the wetland area had upland inclusions, and 4) if the site was in the range of where this orchid could potentially occur.

Based on these criteria, 8 of the 34 grassland areas were potential habitat for this orchid (**Table 2**). Of these selected locations, one was high quality grassland, three were medium quality grassland, and two were low quality grassland.

4.0 Discussion

Dakota skipper (*Hesperia dacotae*)

Most of the locations designated as potential habitat for the Dakota skipper were located on ridges or hilly areas containing native prairie with at least one Dakota skipper pollen plant, and little blue stem, the preferred food for Dakota skipper larvae.

The threats to Dakota skipper habitat identified by the USFWS Guidelines include burning, haying, grazing, pesticide use, and invasion by non-native plants, including exotic pasture grasses. During this survey there were few signs of burning or pesticide use, but grazing and exotic plants were present. The most severe threat to the few remaining sections of high and moderate quality grassland (potential Dakota skipper sites) was grazing coupled with exotic pasture grass invasion and/or planting. On several occasions, especially at the only site in Kingsbury County, there was clear evidence that grazing facilitated the invasion of exotic pasture grasses.

Pipeline construction reduces native grassland areas by destroying the prairie sod. Once disturbed, this sod is extremely slow (over 100 years) at redeveloping. A second threat is that disturbing soil along the construction ROW encourages the establishment of exotic pasture grasses, especially smooth brome (*Bromus inermis*) and the establishment of noxious weeds. The most aggressive weeds in this area are the plumeless thistle (*Carduus ancanthoides*) toward the south, Canadian thistle (*Cirsium arvense*) and wormwood (*Artemisia absinthimim*) in wetlands and mesic pastures, and in some areas the invasion of sweet clover (Melilotus), bindweed (*Convolvulus arvense*), and leafy spurge (*Euphorbia esula*).

Table 1 **Summary of the 38 Sites Along the Keystone Pipeline Route in North and South Dakota that were Surveyed from September 11 to September 16, 2006 for: 1) Potential Habitat for the Prairie Fringed Orchid (*Platanthera praeclara*), 2) Potential Habitat for the Dakota Skipper Butterfly (*Hesperia dacotae*), and 3) for the Presence of Quality Native Grassland**

	Feature Number	Survey Date	Start MP	End MP	County	State	Survey Type	Quality of Grassland Habitat	Suitable Dakota Skipper or Western Prairie Fringed Orchid Habitat?	Site Summary
1	None Designated	9/12/2006	200.4	202.0	Sargent	ND	Drive-by	None	No	Agriculture.
2	TDH1NDSA003	9/12/2006	202.0	202.5	Sargent	ND	Drive-by	Low	No	Wet lowland, few prairie plants, BRIN dominated.
3	None Designated	9/12/2006	202.4	203.6	Sargent	ND	Drive-by	None	No	Agriculture.
4	TDH1NDSA002	9/12/2006	203.6	203.9	Sargent	ND	Drive-by	High	Yes, Dakota skipper	Appears to be high quality native prairie from road.
5	TDH1NDSA001	9/12/2006	204.1	205.0	Sargent	ND	Site Visit	High	Yes, Dakota skipper	Very high quality, Government land.
6	None Designated	9/12/2006	205.0	205.6	Sargent	ND	Drive-by	Low	No	BRIN Pasture and wetland mosaic.
7	TDH1NDDI003	9/12/2006	207.8	208.3	Dickey	ND	Drive-by	Medium	Yes, prairie fringed orchid	Wetland meadow with upland inclusions.
8	TDH1NDDI002	9/12/2006	210.8	211.9	Dickey	ND	Site Visit	High	Yes, prairie fringed orchid	Grazed, wetland meadow with upland inclusions.
9	None Designated	9/12/2006	211.9	212.4	Dickey	ND	Drive-by	None	No	Agriculture.
10	TDH1NDDI001	9/12/2006	212.9	214.0	Dickey	ND	Drive-by	None	Yes, prairie fringed orchid	Large, high quality wetland with few upland areas.
11	TDH1SDMA001	9/13/2006	228.5	228.9	Marshall	SD	Site Visit	None	No	Large, wetland meadow on State land.
12	None Designated	9/11/2006	258.6	258.8	Day	SD	Drive-by	Low	Yes, prairie fringed orchid	Appeared to be heavily grazed from the road.
13	TDHISDDA005	9/11/2006	260.0	260.8	Day	SD	Drive-by	Low	No	Heavily grazed, with only a few native grasses and forbs.
14	TDH1SDDA004	9/11/2006	261.4	262.6	Day	SD	Drive-by	Low	No	Wheatgrass pasture with few native grasses and forbs.
15	TDH1SDDA003	9/11/2006	264.5	264.8	Day	SD	Site Visit	Low	No	Heavily grazed BRIN ridge near a meandering creek.
16	TDH1SDDA002	9/11/2006	265.2	266.2	Day	SD	Site Visit	High	Yes, Dakota skipper	Native prairie adjacent to a hilly, high quality prairie.

Table 1 **Summary of the 38 Sites Along the Keystone Pipeline Route in North and South Dakota that were Surveyed from September 11 to September 16, 2006 for: 1) Potential Habitat for the Prairie Fringed Orchid (*Platanthera praeclara*), 2) Potential Habitat for the Dakota Skipper Butterfly (*Hesperia dacotae*), and 3) for the Presence of Quality Native Grassland**

	Feature Number	Survey Date	Start MP	End MP	County	State	Survey Type	Quality of Grassland Habitat	Suitable Dakota Skipper or Western Prairie Fringed Orchid Habitat?	Site Summary
17	None Designated	9/11/2006	267.2	267.7	Day	SD	Drive-by	Low	No	Pasture with introduced grasses.
18	TDH1SDDA001	9/11/2006	270.6	271.6	Day	SD	Drive-by	Low	No	Heavily grazed riparian area in corridor.
19	None Designated	9/11/2006	272.3	273.3	Clark	SD	Drive-by	Low	No	Pasture with introduced grasses.
20	TDH1SDCL005	9/13/2006	277.2	277.9	Clark	SD	Drive-by	Medium	Yes, prairie fringed orchid	A mosaic of pasture/wetland and grassland.
21	TDH1SDCL006	9/13/2006	278.4	279.2	Clark	SD	Drive-by	Medium	Yes, prairie fringed orchid	A mosaic of pasture/wetland and grassland.
22	TDH1SDCL004	9/11/2006	280.1	280.5	Clark	SD	Drive-by	Low	No	BRIN dominated alkaline pasture.
23	None Designated	9/11/2006	280.8	281.1	Clark	SD	Drive-by	Low	No	Pasture with introduced grasses.
24	TDH1SDCL003	9/11/2006	285.3	285.7	Clark	SD	Drive-by	Low	No	Heavily grazed, BRIN dominated riparian/meadow.
25	TDH1SDCL002	9/11/2006	293.7	294.1	Clark	SD	Drive-by	Low	No	Heavily grazed, BRIN dominated riparian/meadow.
26	TDH1SDCL001	9/11/2006	296.9	297.9	Clark	SD	Site Visit	Medium	Yes, Dakota skipper	Wetland swale with upland (blue grama) inclusions.
27	TDH1SDKI001	9/16/2006	325.1	326.4	Kingsbury	SD	Drive-by	High/North Medium/ South	No	Road dissects High (N) and Medium (S) quality grasslands.
28	TDH1SDMI001	9/16/2006	342.9	344.0	Miner	SD	Drive-by	Low	No	Redstone Creek with BRIN, *Poa* and AGCR pasture grasses.
29	TDH1SDMI002	9/16/2006	358.5	359.9	Miner	SD	Drive-by	Low	No	BRIN pasture with wetland spots.
30	TDH1SDMC001	9/16/2006	383.9	384.5	McCook	SD	Drive-by	Medium to High	Yes, prairie fringed orchid	BRIN pasture with wetlands and native grassland on hills.

Table 1 **Summary of the 38 Sites Along the Keystone Pipeline Route in North and South Dakota that were Surveyed from September 11 to September 16, 2006 for: 1) Potential Habitat for the Prairie Fringed Orchid (*Platanthera praeclara*), 2) Potential Habitat for the Dakota Skipper Butterfly (*Hesperia dacotae*), and 3) for the Presence of Quality Native Grassland**

	Feature Number	Survey Date	Start MP	End MP	County	State	Survey Type	Quality of Grassland Habitat	Suitable Dakota Skipper or Western Prairie Fringed Orchid Habitat?	Site Summary
31	TDH1SDHU001	9/16/2006	389.7	390.6	Hutchinson	SD	Drive-by	Low	No	BRIN / *Poa* dominated pasture.
32	TDH1SDHU002	9/16/2006	390.9	391.7	Hutchinson	SD	Site Visit	High	Yes, Dakota skipper, prairie fringed orchid	By Wolf Creek, rolling, native prairie hills.
33	TDH1SDYA006	9/15/2006	418.7	419.2	Yankton	SD	Site Visit	Medium	No	Grassland on ridges. BRIN / *Poa* pasture & weeds in wet spots.
34	TDH1SDYA005	9/15/2006	419.6	420	Yankton	SD	Site Visit	High	Yes, Dakota Skipper	Mosaic of BRIN pasture with quality BOGR prairie spots.
35	TDH1SDYA004	9/15/2006	420.6	420.8	Yankton	SD	Drive-by	High	Yes, Dakota Skipper	Moderately grazed hills with native grassland.
36	TDH1SDYA003	9/15/2006	421.8	422.1	Yankton	SD	Site Visit	High	Yes, Dakota Skipper	By James River, native prairie ridges between cedar/broadleaf tree-filled ravines.
37	TDH1SDYA002	9/15/2006	423.5	423.8	Yankton	SD	Site Visit	Medium	No	Heavily grazed, but BOGR dominated.
38	TDH1SDYA001	9/14/2006	426.7	428.9	Yankton	SD	Site Visit	Low	No	BRIN and *Carduus acanthoides* in swales: few native plants.

ND – North Dakota

SD – South Dakota

BRIN – *Bromus inermis*

AGCR – *Agropyron cristatum*

BOGR – *Bouteloua gracilis*

Table 2 Summary Sites that Contain Suitable Dakota Skipper and Western Prairie Fringed Orchid Habitat

Feature Number	Start MP	End MP	County	State	Quality of Grassland Habitat	Survey Type	Site Summary
TDH1NDSA002	203.6	203.9	Sargent	ND	High	Dakota skipper	Appears to be high quality native prairie from road.
TDH1NDSA001	204.1	205.0	Sargent	ND	High	Dakota skipper	Very high quality, Government land.
TDH1NDDI003	207.8	208.3	Dickey	ND	Medium	western prairie fringed orchid	Wetland meadow with upland inclusions.
TDH1NDDI002	210.8	211.9	Dickey	ND	High	western prairie fringed orchid	Grazed, wetland meadow with upland inclusions.
TDH1NDDI001	212.9	214.0	Dickey	ND	None	western prairie fringed orchid	Large, high quality wetland with few upland areas.
None Designated	258.6	258.8	Day	SD	Low	western prairie fringed orchid	Appeared to be heavily grazed from the road.
TDH1SDDA002	265.2	266.2	Day	SD	High	Dakota skipper	Native prairie adjacent to a hilly, high quality prairie.
TDH1SDCL005	277.2	277.9	Clark	SD	Medium	western prairie fringed orchid	Mosaic of pasture/wetland and grassland.
TDH1SDCL006	278.4	279.2	Clark	SD	Medium	western prairie fringed orchid	Mosaic of pasture/wetland and grassland.
TDH1SDCL001	296.9	297.9	Clark	SD	Medium	Dakota skipper	Wetland swale with upland (blue grama) inclusions.
TDH1SDMC001	383.9	384.5	McCook	SD	Medium to High	western prairie fringed orchid	BRIN pasture with wetlands and native grassland on hills.
TDH1SDHU002	390.9	391.7	Hutchinson	SD	High	Dakota skipper, western prairie fringed orchid	By Wolf Creek, rolling, native prairie hills.
TDH1SDYA005	419.6	420	Yankton	SD	High	Dakota skipper	Mosaic of BRIN pasture with quality BOGR prairie spots.

Table 2 Summary Sites that Contain Suitable Dakota Skipper and Western Prairie Fringed Orchid Habitat

Feature Number	Start MP	End MP	County	State	Quality of Grassland Habitat	Survey Type	Site Summary
TDH1SDYA004	420.6	420.8	Yankton	SD	High	Dakota skipper	Moderately grazed hills with native grassland.
TDH1SDYA003	421.8	422.1	Yankton	SD	High	Dakota skipper	By James River, native prairie ridges between cedar/broadleaf tree-filled ravines.

ND – North Dakota

SD – South Dakota

BRIN – *Bromus inermis*

AGCR – *Agropyron cristatum*

BOGR – *Bouteloua gracilis*

Western prairie fringed orchid (*Plantanthera praeclara*)

Declines in the western prairie fringed orchid populations, as identified by the USFWS Guidelines, have been caused by the drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. The most apparent threats to the orchid along the proposed Keystone Pipeline Project construction ROW include conversion of its habitat to agriculture, haying, and heavy grazing.

5.0 Grassland Survey Sites in Nebraska

The Nebraska Game and Park Commission (NGPC) indicated that it has identified and mapped remnant native grasslands in Nebraska. To date, Keystone has not received the NGPC data to determine whether any of these remnant grasslands would be crossed by the project.

ENSR identified as potential native grassland or high quality grassland areas from aerial photograph interpretation. These areas are very limited in number, and therefore, all of these areas should be included in the 2007 surveys for native grassland species. **Table 3** details the locality information for these additional survey areas in Nebraska. Aerial photographs of these survey areas are presented in Appendix III.

Table 3 Additional Grassland Survey Sites in Nebraska for the 2007 Grassland Species Surveys

Start MP	End MP	County	Grassland Species
436.0	436.1	Cedar	Western prairie fringed orchid, small white lady's slipper
503.4	503.5	Stanton	Western prairie fringed orchid, small white lady's slipper
540.9	541.2	Colfax	Western prairie fringed orchid, small white lady's slipper
548.1	548.2	Butler	Western prairie fringed orchid, small white lady's slipper
564.4	564.7	Butler	Western prairie fringed orchid, small white lady's slipper
594.8	595.1	Saline	Western prairie fringed orchid, small white lady's slipper
606.4	606.5	Saline	Western prairie fringed orchid, small white lady's slipper
622.2	622.4	Jefferson	Western prairie fringed orchid, small white lady's slipper
635.1	636.8	Jefferson	Western prairie fringed orchid, small white lady's slipper
637.0	637.4	Jefferson	Western prairie fringed orchid, small white lady's slipper

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Appendix I

Photos, Site Summaries, and Survey Location Maps

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Grassland Habitat Quality	Suitable T&E Habitat?
TDH1NDSA003	9/12/2006	202.0	202.5	Sargent	ND	Drive By	Low	No

Site Summary: Over 90% smooth brome (*Bromus inermis*) pasture with weedy wormwood (*Artemisia absinthimum*) in spots. A railroad dissects this pasture (to the left of this photograph). This pasture area is not suitable habitat for any of the target species.

Feature TDH1SDSA003: Overview of this smooth brome (*Bromus inermis*) dominated pasture.

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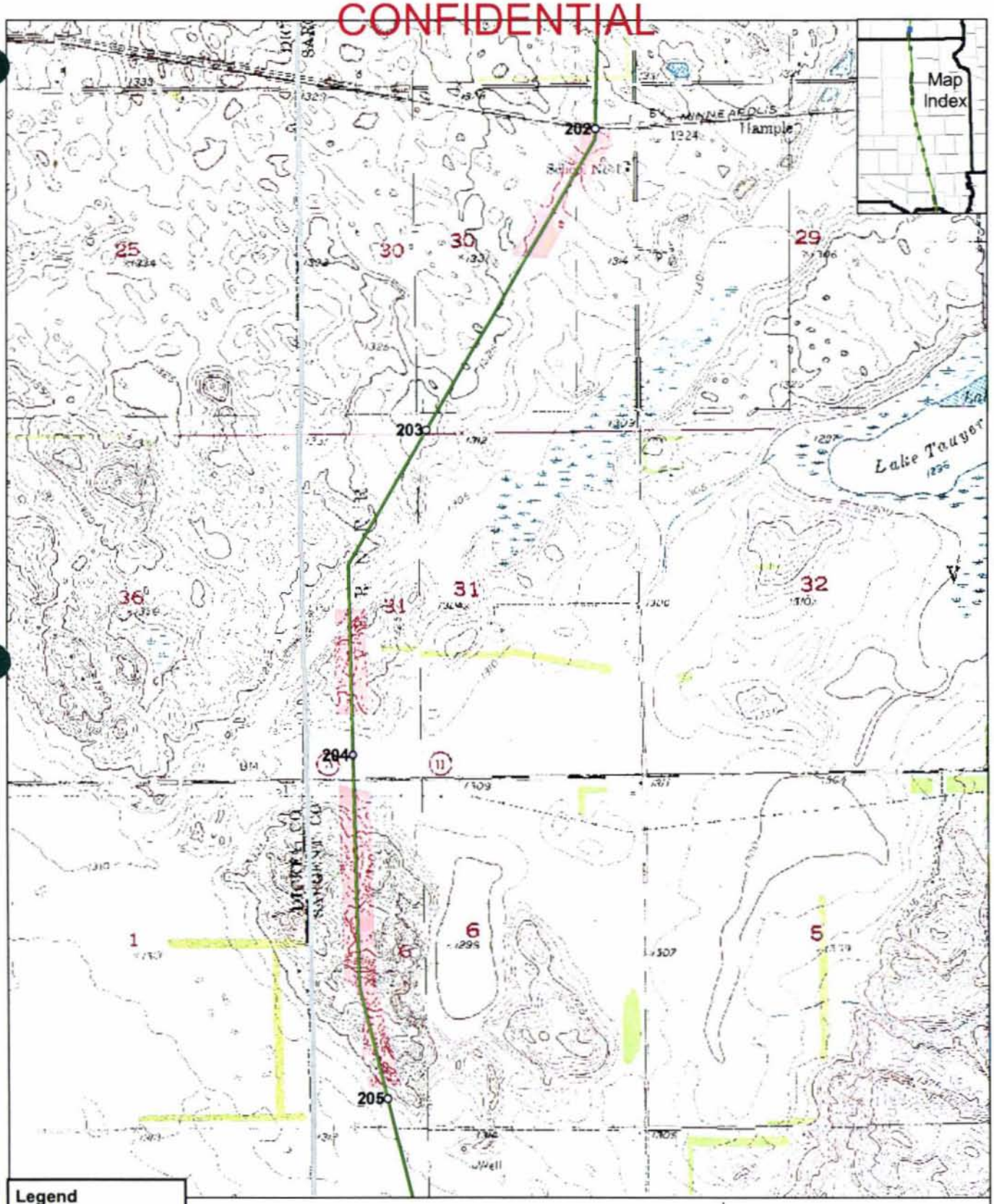

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1NDSA002	9/12/2006	203.6	203.9	Sargent	ND	Drive By	High	Yes, Dakota skipper

Site Summary: This agriculture field is by a paved road. However, on the hills in the background of this photograph is grassland ca. 0.25 mile north that was ranked as high quality (we hand no access). This grassland is similar to feature TDH1NDSA001 and is designated as Dakota skipper habitat.

Feature TDH1NDSA002: This high quality grassland is in the distance, past the agriculture field.

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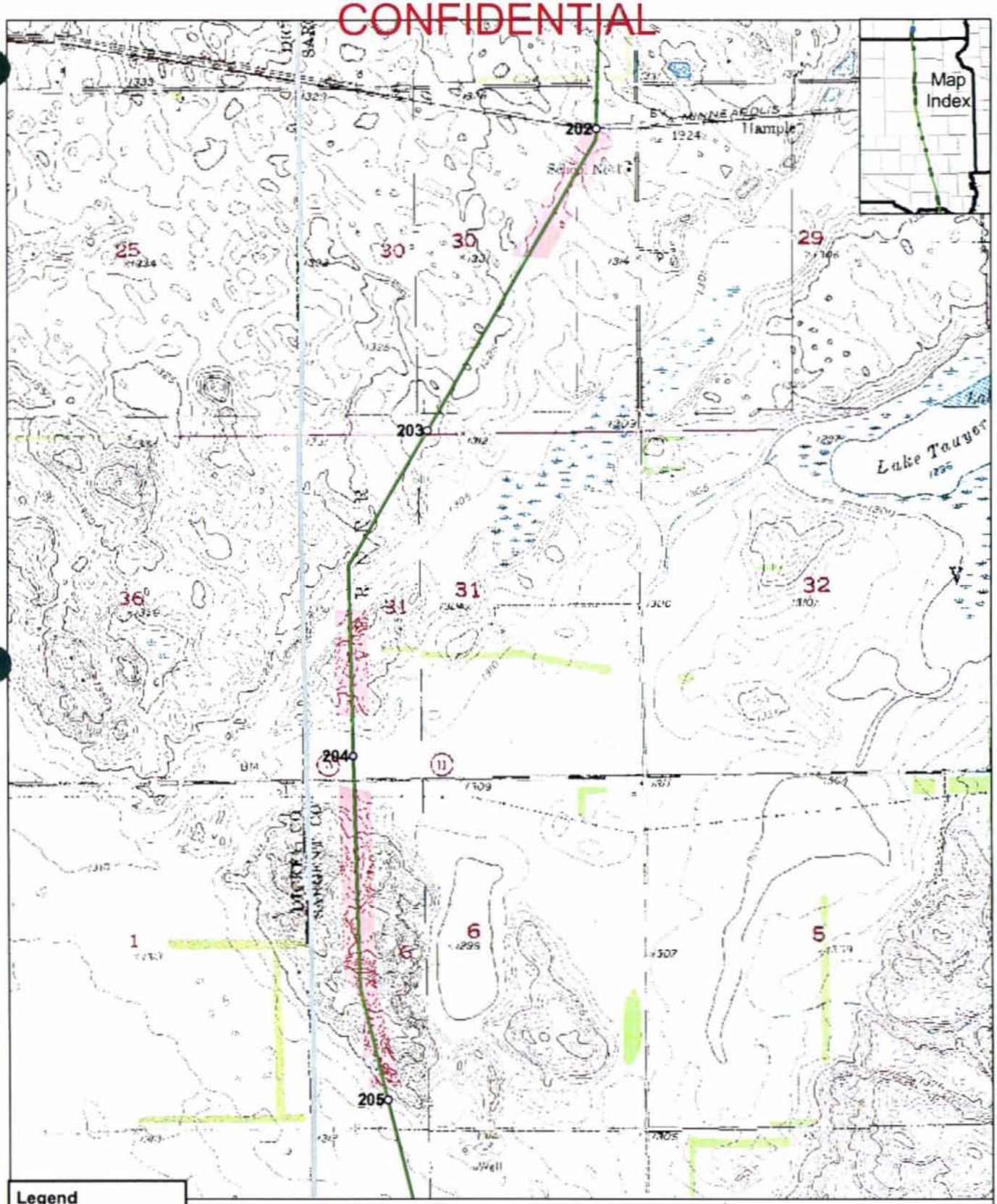

Legend

- Mileposts
- Proposed Centerline
- Surveyed Grasslands
- State Boundary
- County Boundary

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Map 1 of 21

Surveyed Grasslands

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1NDSA001	9/12/2006	204.1	205.0	Sargent	ND	Site Visit	High	Yes, Dakota skipper

Site Summary: This is a very high quality grassland site. The site contains rolling hills of rock grass (*Kohleria macrantha*), little blue stem (*Schizachyrium scoparium*), and big blue stem (*Andropogon gerardii*). Native forbs include white sage (*Artemisia ludoviciana*) on rocky hillsides, and Dakota skipper pollen plants such as black Sampson (*Echinacea*) and leadplant (*Amopha*). Other pollen plants for the Dakota skipper, such as fleabane (*Erigeron*), are likely to be present, but were not seen in mid-September. This site also has animal burrows and access to water for wildlife. A re-route to the west of this high quality area (along a road) deserves consideration.

Feature:TDH1NDSA001: View to the east of this high quality grassland area.

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Feature TDH1NDSA001: Overview of this very high quality grassland area. This is the largest tract of native grassland seen during this survey.

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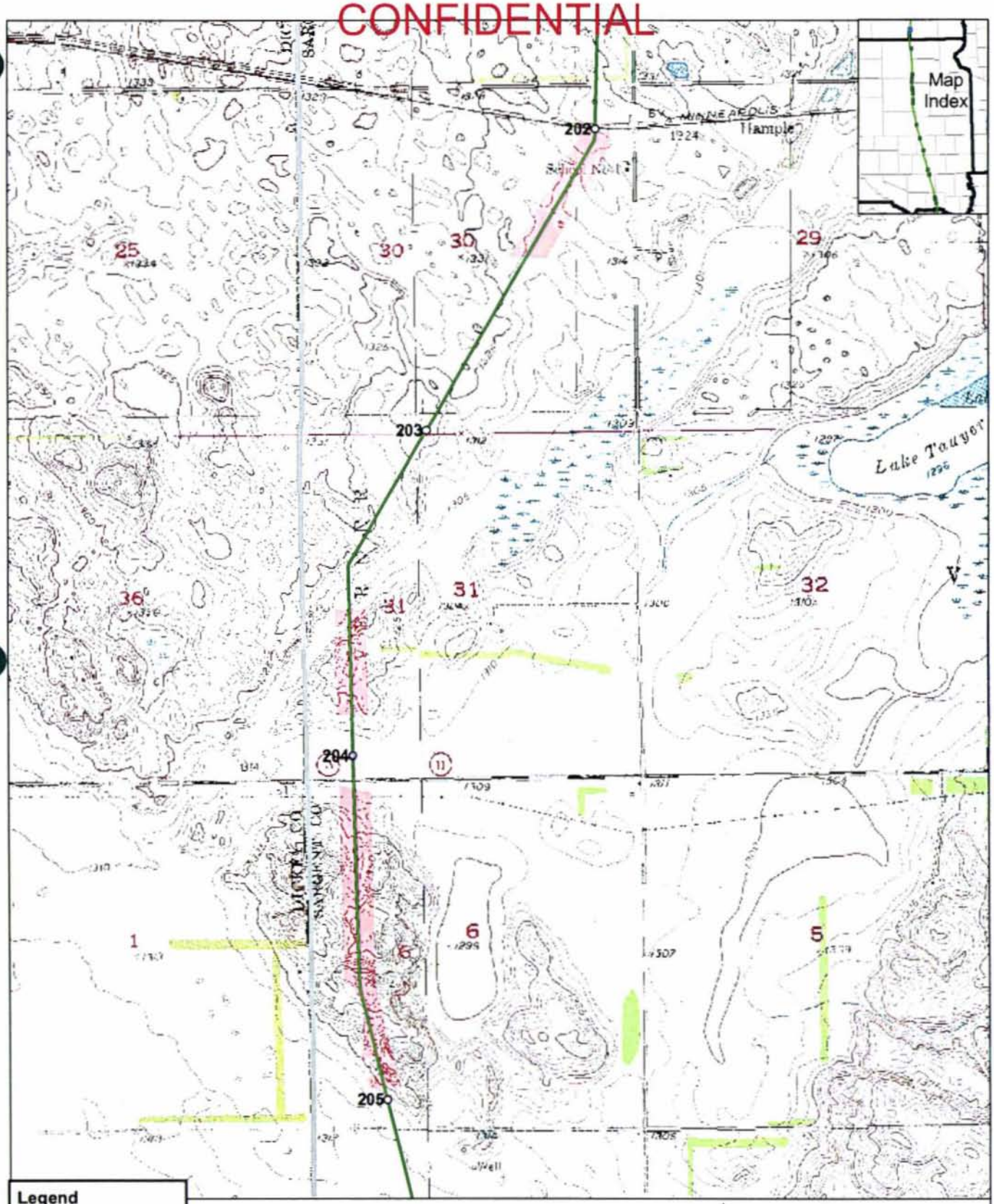

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1NDDI003	9/12/2006	207.8	208.3	Dickey	ND	Drive By	Medium	Yes, prairie fringed orchid

Site Summary: This lowland meadow has a mosaic of wetlands (*Typha*, *Scholenopectus*, *Hordeum jubatum*, *Spartina pectinata*, etc.), with upland inclusions. Despite weeds and grazing this is potential habitat for the prairie fringed orchid. This location is visually similar to TDH1NDDI002.

Feature TDH1NDDI003: Overview of wet meadow with upland inclusions.

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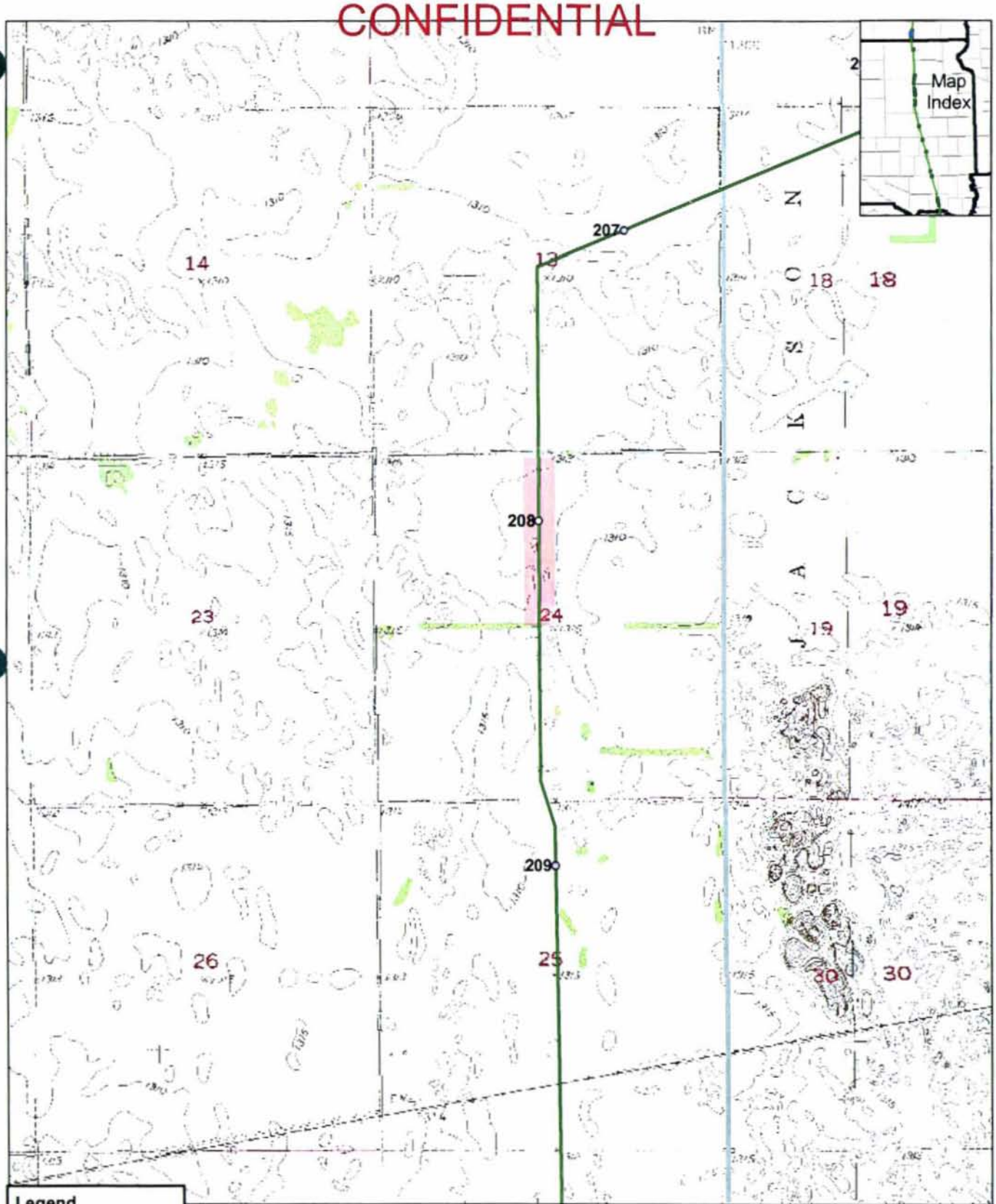

Legend

- Mileposts
- Proposed Centerline
- Surveyed Grasslands
- State Boundary
- County Boundary

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Map 2 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1NDDI002	9/12/2006	210.8	211.9	Dickey	ND	Site Visit	High	Yes, prairie fringed orchid

Site Summary: This lowland meadow has a mosaic of wetlands (*Typha*, *Scholenopectus*, *Hordeum jubatum*, *Spartina pectinata*, etc.), with upland inclusions. Despite weeds and grazing this grassland is potential habitat for the prairie fringed orchid. The Great Plains lady's tresses orchid (*Spiranthes cf. magnicamphorum*) occurs at this location (see photo below).

Feature TDH1NDDI002: Overview of mosaic area with uplands and wetlands.

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Feature TDH1NDDI002: Great Plains Lady's tresses orchid (*Spiranthes cf. magnicamphorum*)

Feature TDH1NDDI002: Overview of the *Spiranthes* habitat. Note the distance between the white orchid (to the right) and the wetland (to the left).

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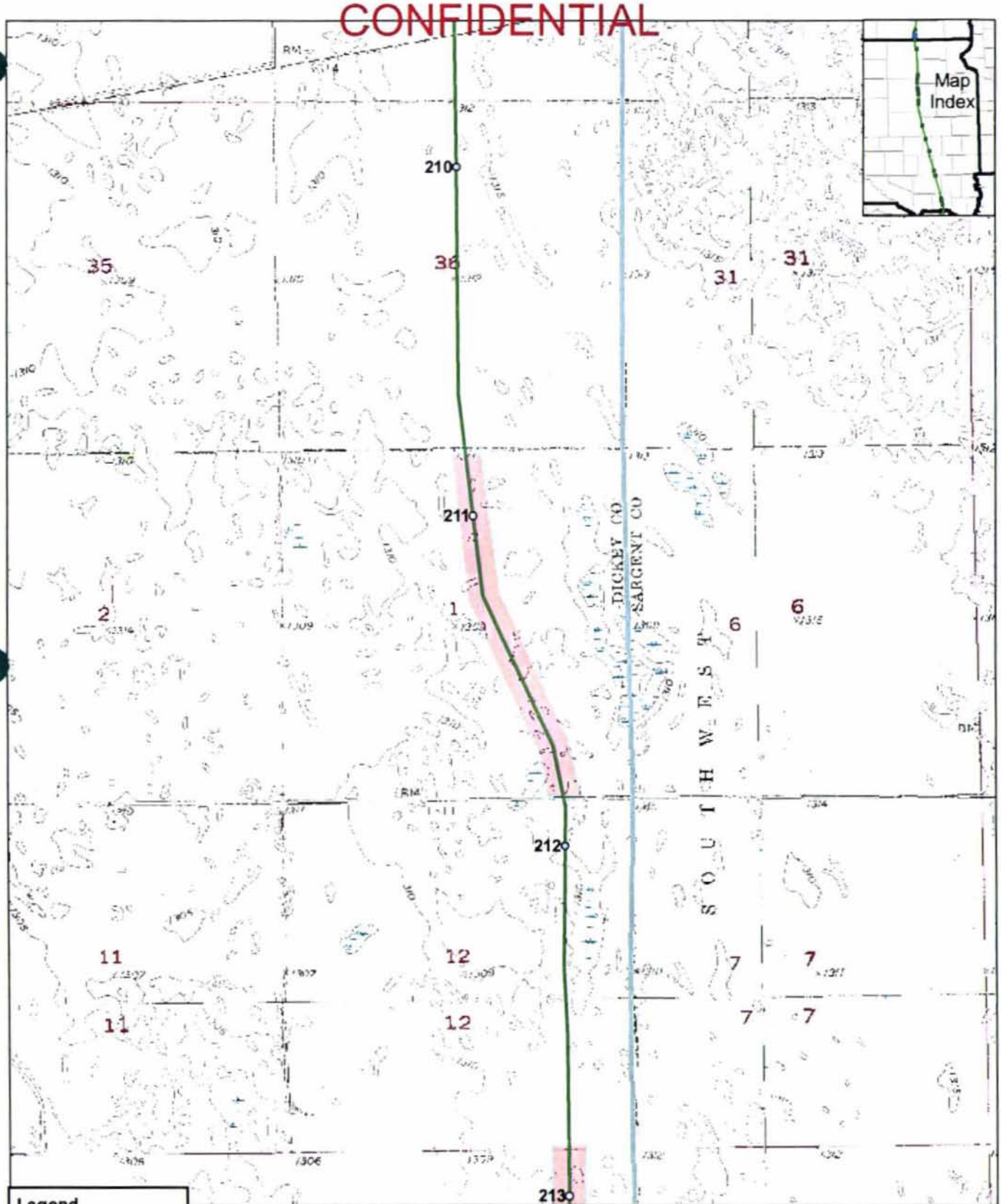

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1NDDI001	9/12/2006	212.9	214.0	Dickey	ND	Drive By	None	Yes, prairie fringed orchid

Site Summary: This is a large wetland with willow (*Sailx spp.)* and cottonwood (*Populus deltoides)* trees scattered among *Typha* (cattails) and prairie cordgrass (*Spartina pectinata)*. Some areas are dense with willows while others are 100% cattails. This large wetland meadow also has wooden water-fowl hunting blinds as towers (ca. 15 feet tall) that occur at or near center line (in the distance of the second photograph). This is a high quality wetland with perhaps a few upland, grassy areas where the prairie fringed orchid could occur.

Feature TDH1NDDI001: Large wetland with willows (*Salix* sp), cattails (*Typha sp*) and a few cottonwood trees (*Populus deltoides*).

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Feature TDH1NDDI001: Large wetland with several wooden hunting towers (blinds) near the center.

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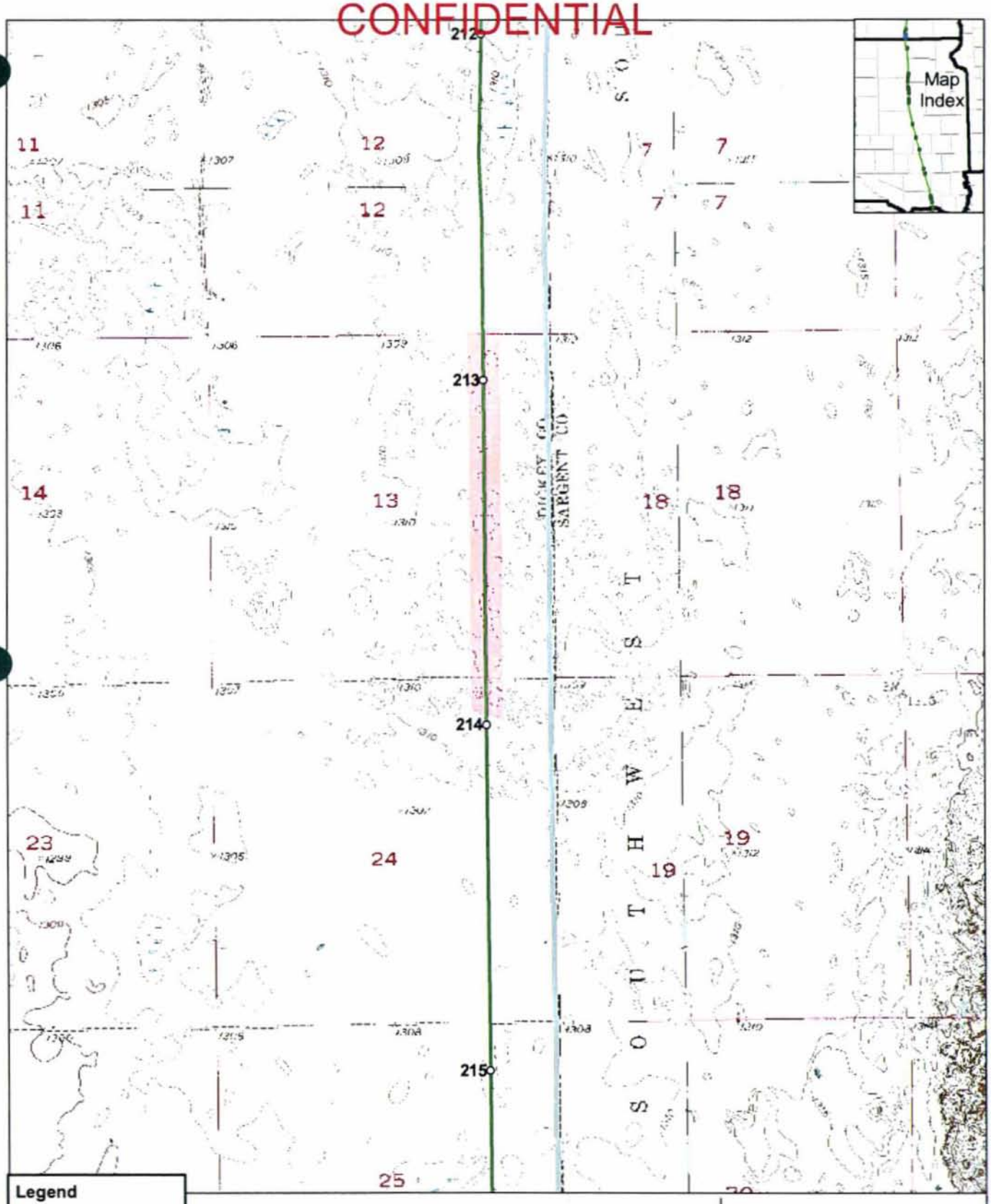

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDMA001	9/13/2006	228.5	228.9	Marshall	SD	Site Visit	None	No

Site Summary: This area appeared as grassland on the aerial photographs. However, it is dominated by reed canary grass (*Phalaris arundinacea*) and a strip of common reed grass (*Phragmites australis*) along the ditch to the north. This is a game production area (note the sign in the third photograph) with patches of smooth brome (*Bromus inermis*). This is a high quality wetland site with minimal grazing, but no grassland inclusions were seen.

Feature TDH1SDMA001: Southern exposure along center line of this large wetland, dominated by reed canary grass (*Phalaris arundinacea*) and common reed grass (*Phragmites australis*).

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Feature TDH1SDMA001: View along center line that crosses this canal.

Feature TDH1SDMA001: Sign at the border of this large wetland that is on state land.

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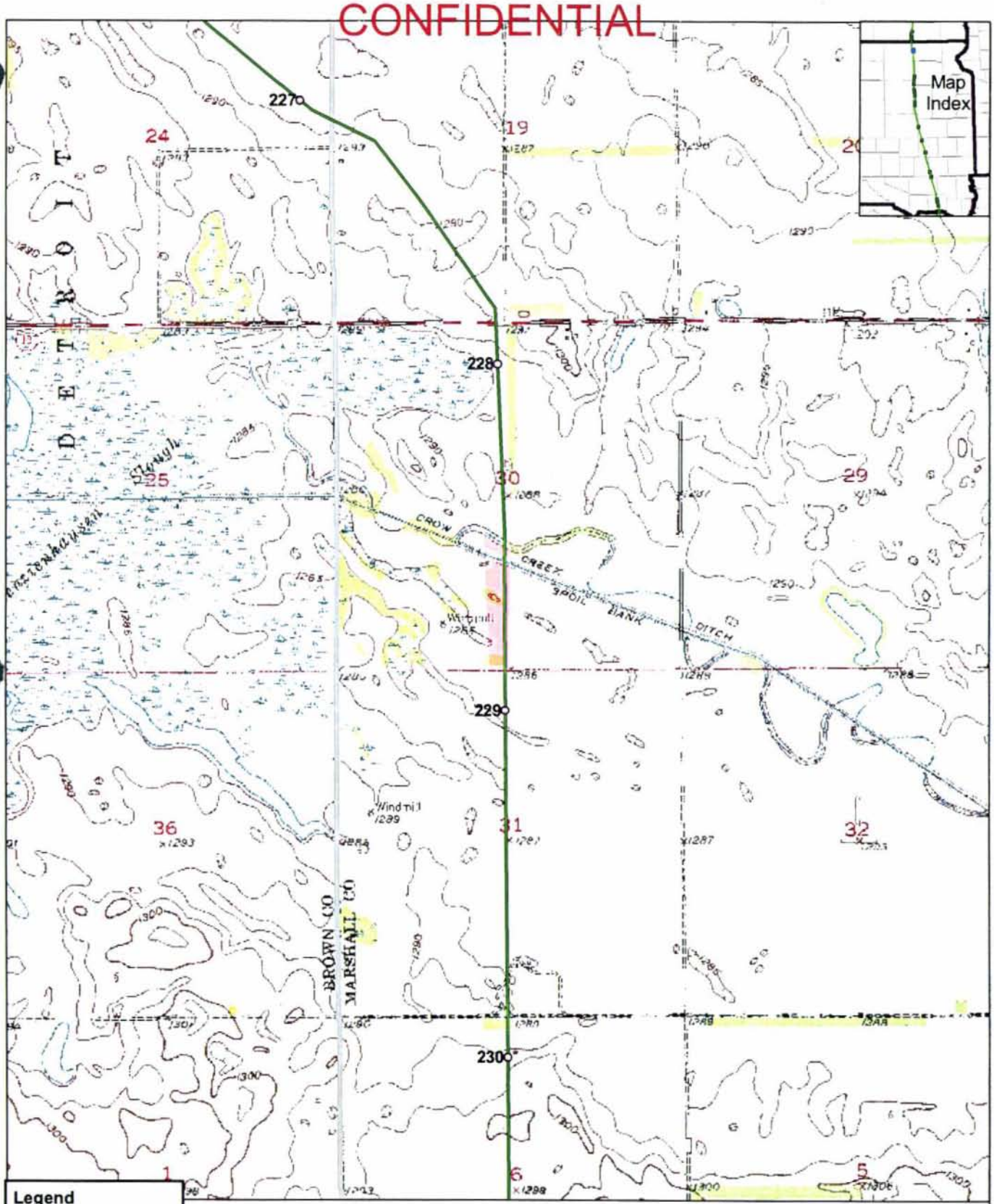

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Map 5 of 21

Surveyed Grasslands

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDHISDDA005	9/11/2006	260.0	260.8	Day	SD	Drive By	Low	No

Site Summary: This site was seen only from a distance (drive-by), but appeared heavily grazed. It is a low quality grassland area.

Feature TDH1SDDA005: Overview of this heavily grazed pasture.

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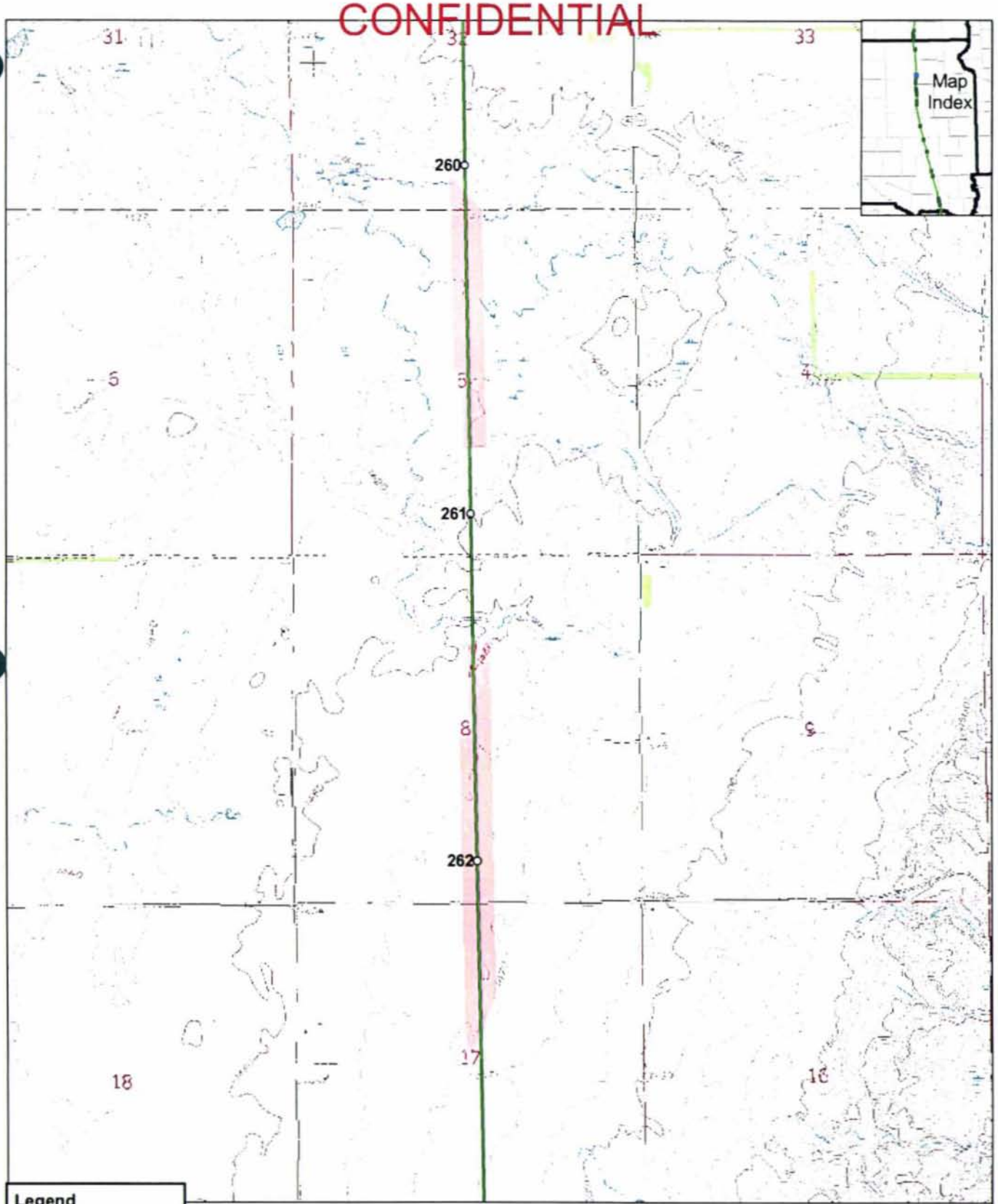

Legend

- Mileposts
- Proposed Centerline
- Surveyed Grasslands
- State Boundary
- County Boundary

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Map 6 of 21

Surveyed Grasslands

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Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDDA004	9/11/2006	261.4	262.6	Day	SD	Drive By	Low	No

Site Summary: A pasture dominated by introduced wheat grasses such as tall and intermediate wheat grass (*Agropyron spp.*) and perhaps other *Agropyron* species. There may be a few native grasses and forbs in spots, but the overall grassland quality is low.

Feature TDH1SDDA004: Pasture planted with wheatgrass (*Agropyron* spp.).

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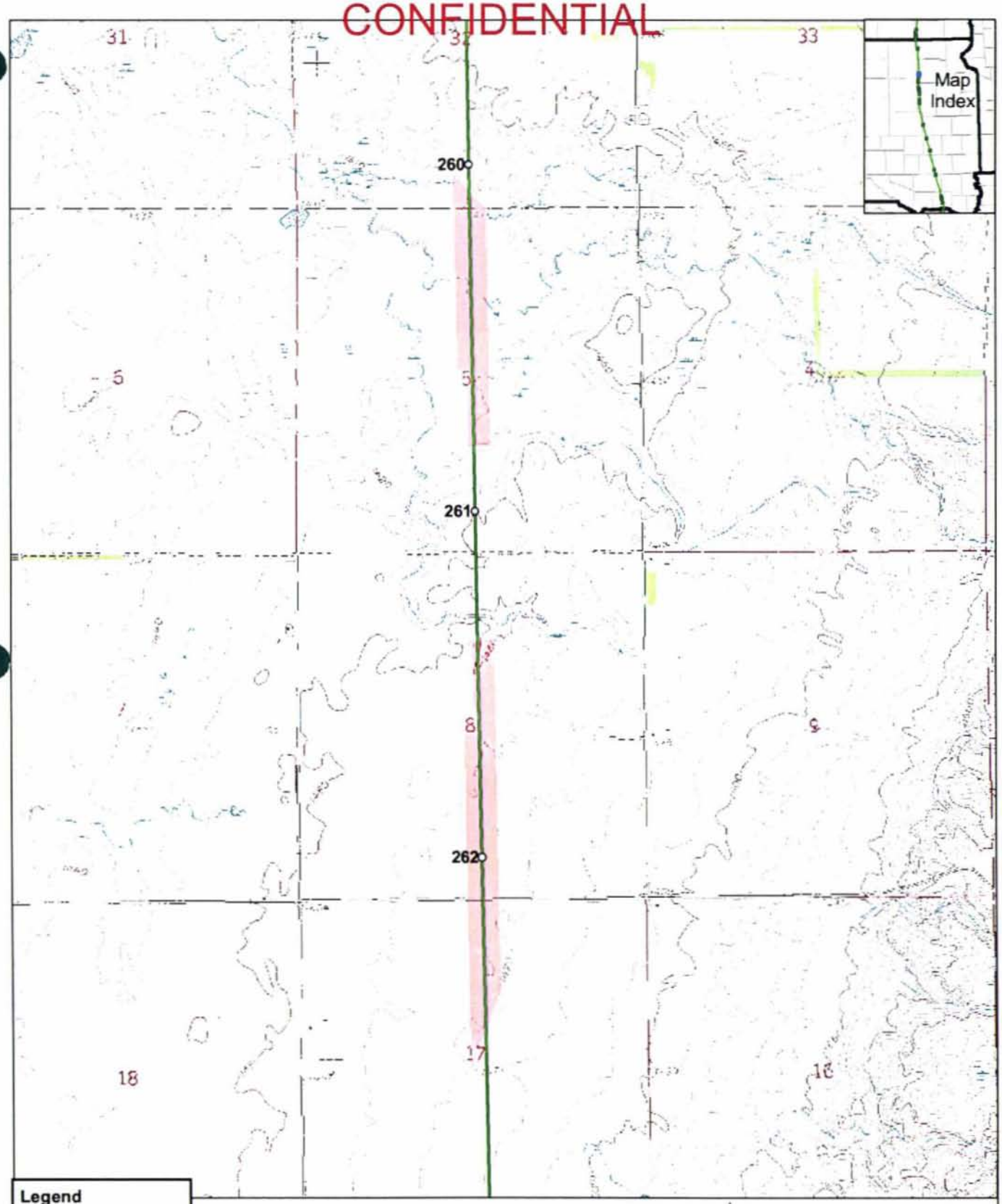

Legend

- Mileposts
- Proposed Centerline
- Surveyed Grasslands
- State Boundary
- County Boundary

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Map 6 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDDA003	9/11/2006	264.5	264.8	Day	SD	Site Visit	Low	No

Site Summary: This is a heavily grazed hillside with an ox-bow by a stream. It is mostly all smooth brome (*Bromus inermis*), but it also has dense spots of Canadian thistle (*Cirsium arvense)* near the stream, patches of wormwood (*Artemisia absinthium*) on the hillsides, and wet spots with prairie cordgrass (*Spartina pectinata*). A few native forbs such as silver scurf pea (*Pediomelum argophyllum*) also occur, but the grassland quality is low.

Feature TDH1SDDA003: Overview of large wetland located at site.

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Feature TDH1SDDA003: Close-up of prairie cordgrass (*Spartina pectinata*)

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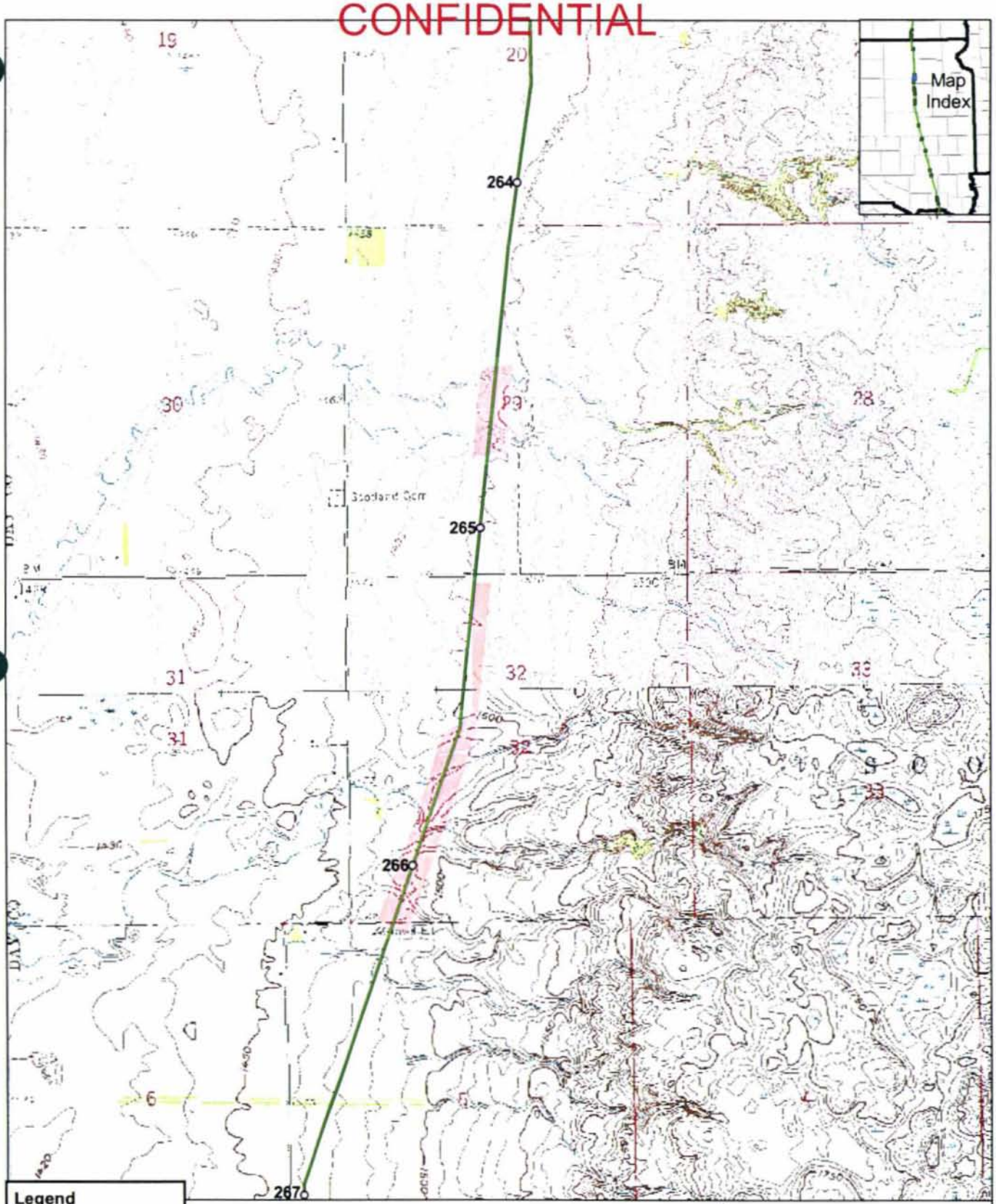

Legend

- Mileposts
- Proposed Centerline
- Surveyed Grasslands
- State Boundary
- County Boundary

Keystone Pipeline Project

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Map 7 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDDA002	9/11/2006	265.2	266.2	Day	SD	Site Visit	High	Yes, Dakota skipper

Site Summary : This is high quality prairie area. The northern section is adjacent (toward the east) to a high quality, rolling hill prairie. To the west is a plowed field (photograph 1). In the middle section of this tract the corridor crosses a disturbed area of a farm. However, in the southern portion the center line actually crosses quality rolling hills with high quality prairie. The southern section of the site contained Dakota skipper pollen plants such as black Sampson (*Echinacea*) and leadplant (*Amopha*). On the rocky slopes were side-oats grama (*Bouteloua curtipendula*), little blue stem (*Schicachyrium scoparium*), and big blue stem (*Andropogon gerardii*). This was the only site where the clonal variety of pincushion cactus *(Coryphantha vivipara*) was seen. Rerouting the pipeline a bit to the west to avoid this high quality prairie should be considered.

Feature TDH1SDDA002: Agricultural field in background.

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Feature TDH1SDDA002: Hills with red-brown little blue stem (*Schizachyrium scoparium*)

Feature TDH1SDDA002: A close-up of leadplant (*Amorpha canescens*)

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Feature TDH1SDDA002: Close-up of Big Blue Stem (*Andropogon gerardii*)

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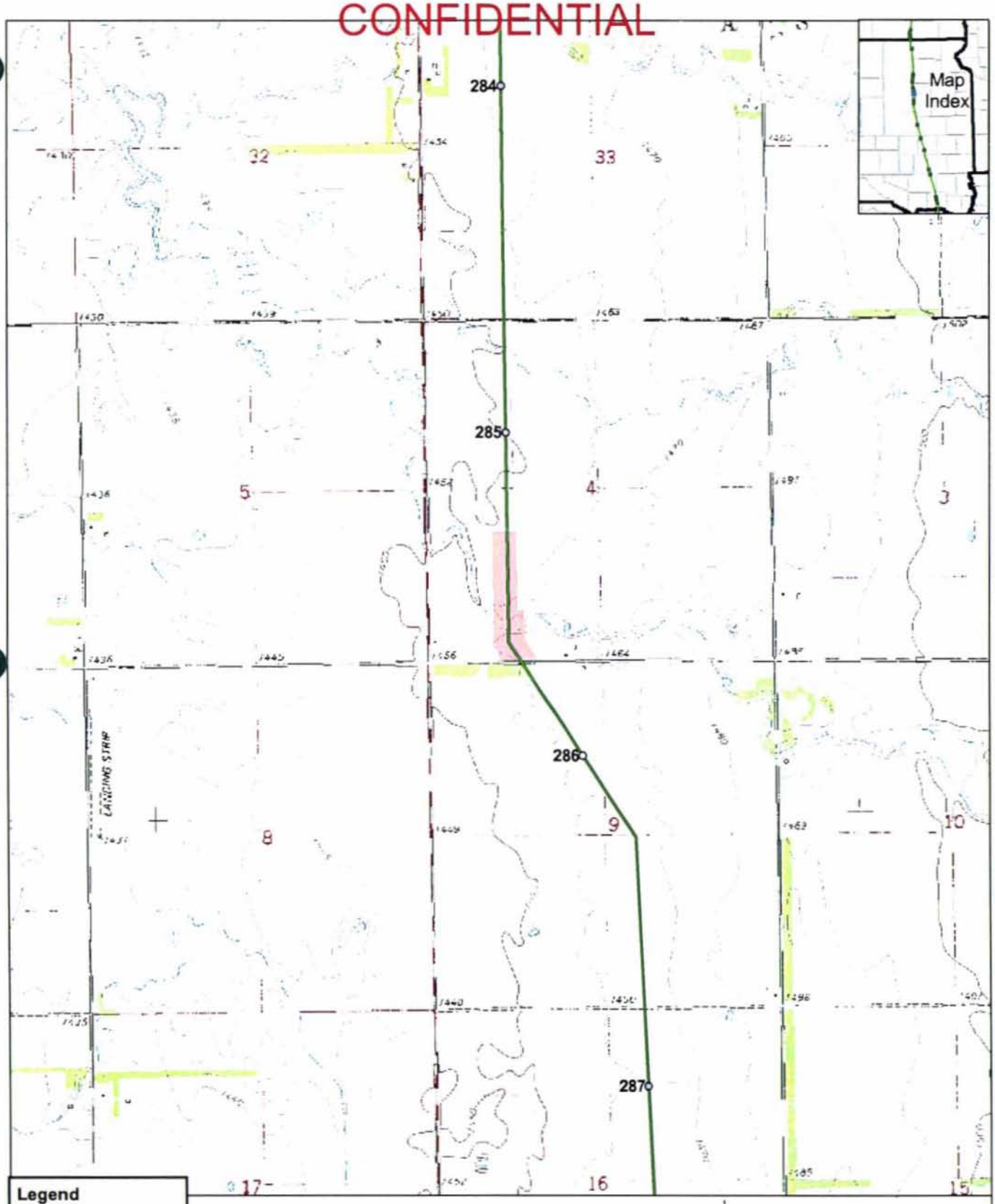

Legend

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Map 11 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDCL002	9/11/2006	293.7	294.1	Clark	SD	Drive By	Low	No

Site Summary: This is a heavily grazed wetland/upland inclusion area where ironweed (*Vernonia* spp.) and cocklebur (*Xanthium canadense*) are common. There are a few peach-leaf willows (*Salix amygdaloides*) and wormwood (*Artemisia absinthimum*) is common in the floodplain pasture.

Feature TDH1SDCL002: The tree is a peach-leaf willow (*Salix amygdaloides*) that is near center line.

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Feature TDH1SDCL002: Just east of the corridor by the road the same stream that also crosses center line has an abundance of Canadian thistle (*Cirsium arvense*).

Feature TDH1SDCL002: Wormwood (*Artemisia absinthium*) in smooth brome (*Bromus inermis*) pasture

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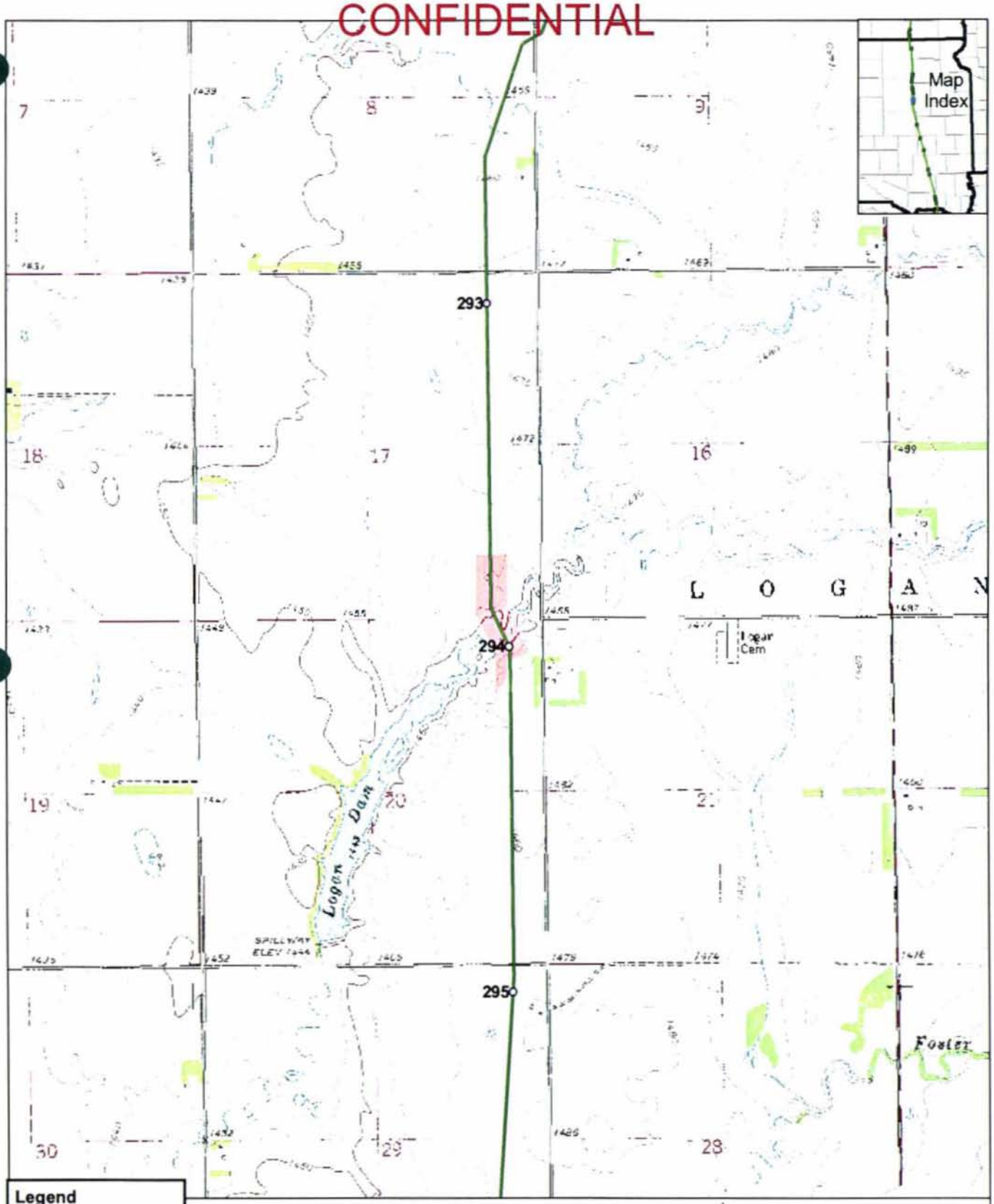

Legend

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Map 12 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDCL001	9/11/2006	296.9	297.9	Clark	SD	Site Visit	Medium	Yes, Dakota skipper

Site Summary: This is a medium quality grassland. It has a stream with rolling hills with native grasses present to the west of the stream. There are pasture grasses such as crested wheat (*Agropyron cristatum*), but there are also large areas with native grasses such as blue grama (*Bouteloua gracilis*) and little blue stem (*Schizachyrium scoparium*). There are also native forbs, including pollen plants for the Dakota skipper butterfly.

Feature TDH1SDCL001: Overview of site.

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Feature TDH1SDCL001: Over view of this area looking south from the road.

Feature TDH1SDCL001: Hillside with an abundance of glodenrrod (*Solidago* spp.).

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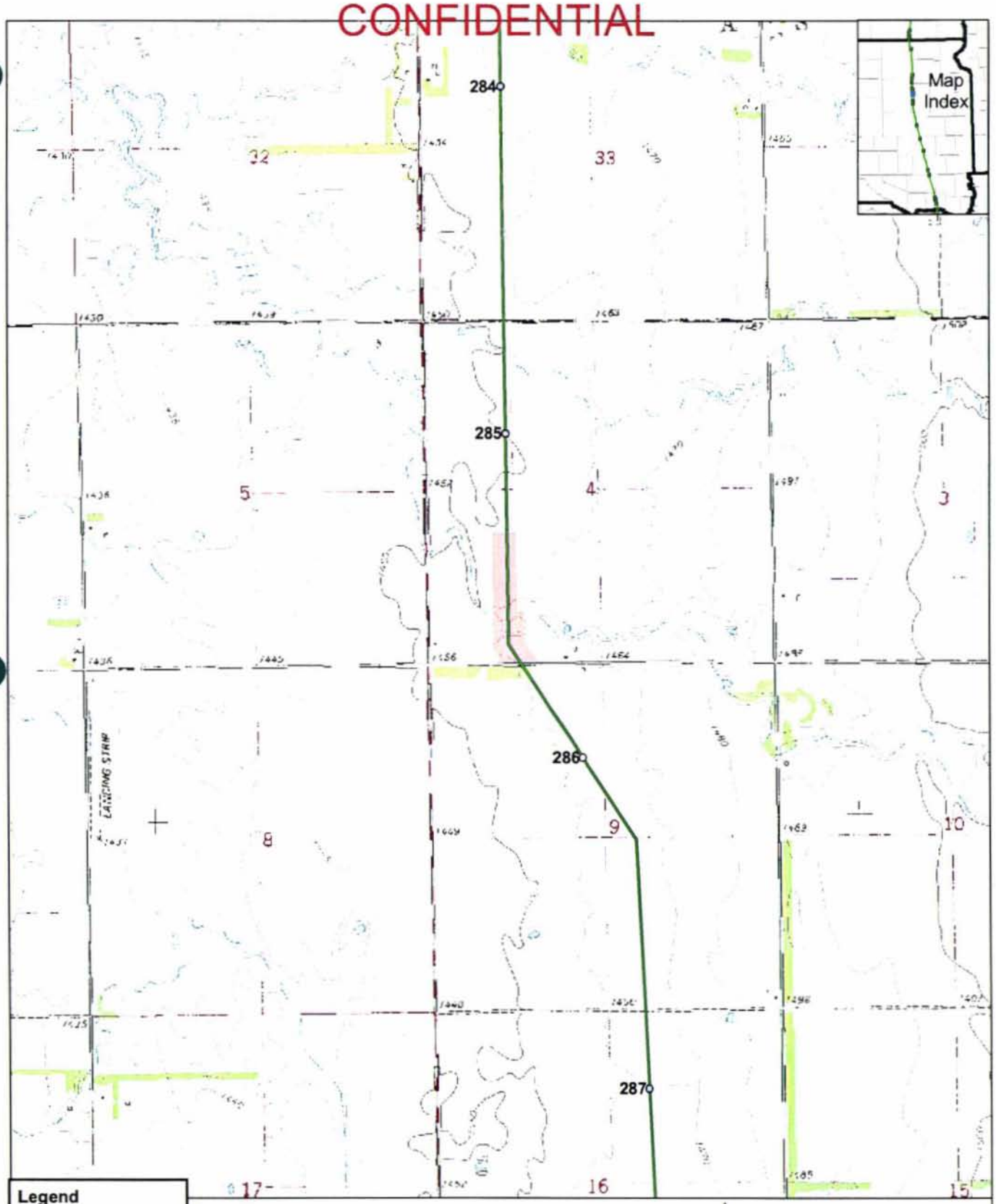
Feature TDH1SDCL001: Yellow flowers of gumweed (*Grindelia squarosa*) and spikes of hoary vervain (*Verbena stricta*).

CONFIDENTIAL



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Map 11 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDCL002	9/11/2006	293.7	294.1	Clark	SD	Drive By	Low	No

Site Summary: This is a heavily grazed wetland/upland inclusion area where ironweed (*Vernonia* spp.) and cocklebur (*Xanthium canadense*) are common. There are a few peach-leaf willows (*Salix amygdaloides*) and wormwood (*Artemisia absinthimum*) is common in the floodplain pasture.

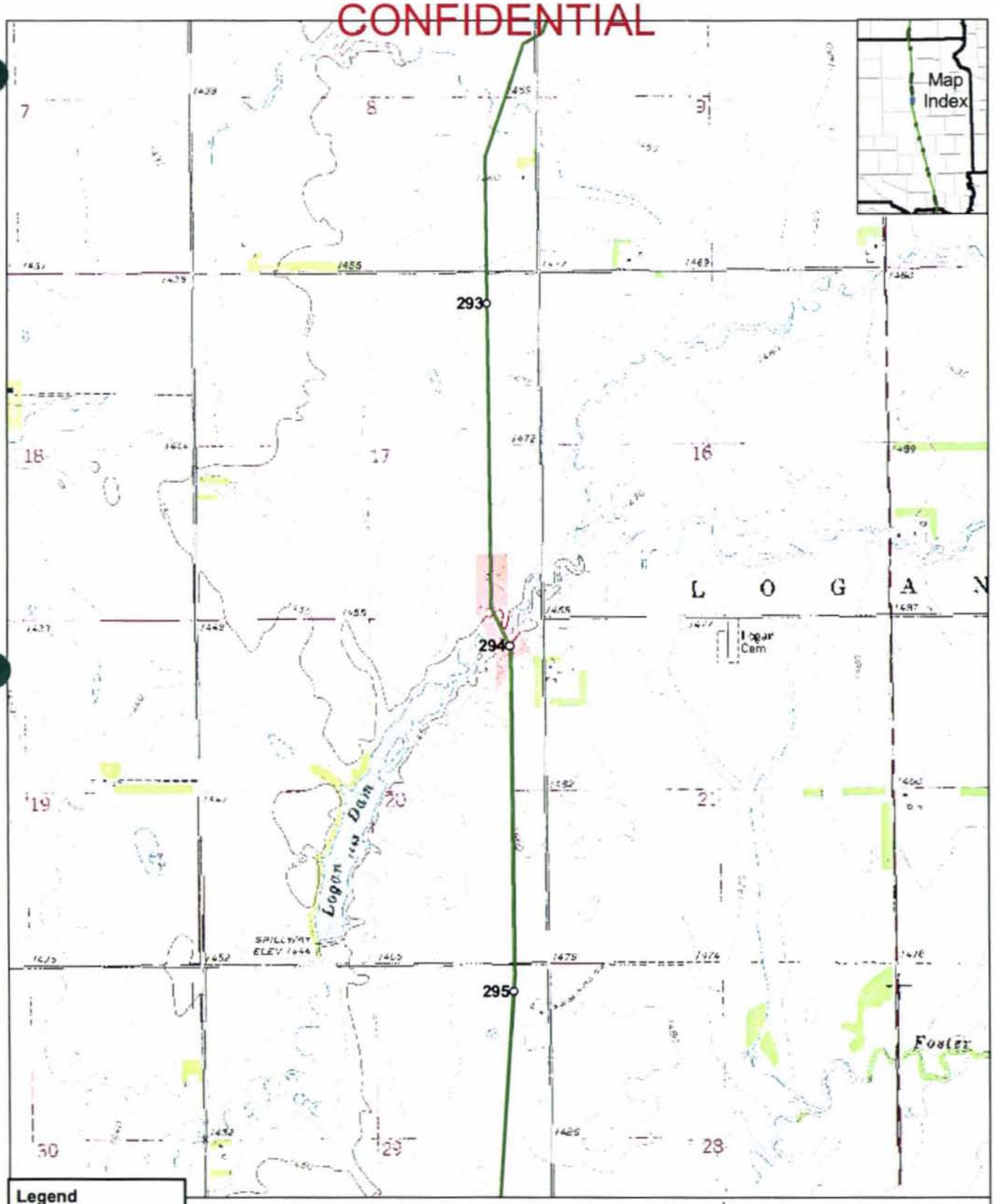
Feature TDH1SDCL002: The tree is a peach-leaf willow (*Salix amygdaloides*) that is near center line.

CONFIDENTIAL

Feature TDH1SDCL002: Just east of the corridor by the road the same stream that also crosses center line has an abundance of Canadian thistle (*Cirsium arvense*).

Feature TDH1SDCL002: Wormwood (*Artemisia absinthium*) in smooth brome (*Bromus inermis*) pasture

CONFIDENTIAL



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Map 12 of 21

Surveyed Grasslands

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CONFIDENTIAL

Feature ID	Survey Date	Start MP	End MP	County	State	Survey Type	Habitat Quality	Suitable T&E Habitat?
TDH1SDCL001	9/11/2006	296.9	297.9	Clark	SD	Site Visit	Medium	Yes, Dakota skipper

Site Summary: This is a medium quality grassland. It has a stream with rolling hills with native grasses present to the west of the stream. There are pasture grasses such as crested wheat (*Agropyron cristatum*), but there are also large areas with native grasses such as blue grama (*Bouteloua gracilis*) and little blue stem (*Schizachyrium scoparium*). There are also native forbs, including pollen plants for the Dakota skipper butterfly.

Feature TDH1SDCL001: Overview of site.

CONFIDENTIAL

Feature TDH1SDCL001: Over view of this area looking south from the road.

Feature TDH1SDCL001: Hillside with an abundance of glodenrrod (*Solidago* spp.).